

0 62
51
2-9
Engineering
Library
OCT 28 1916
UNIV. OF MICH.
LIBRARY

PROCEEDINGS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

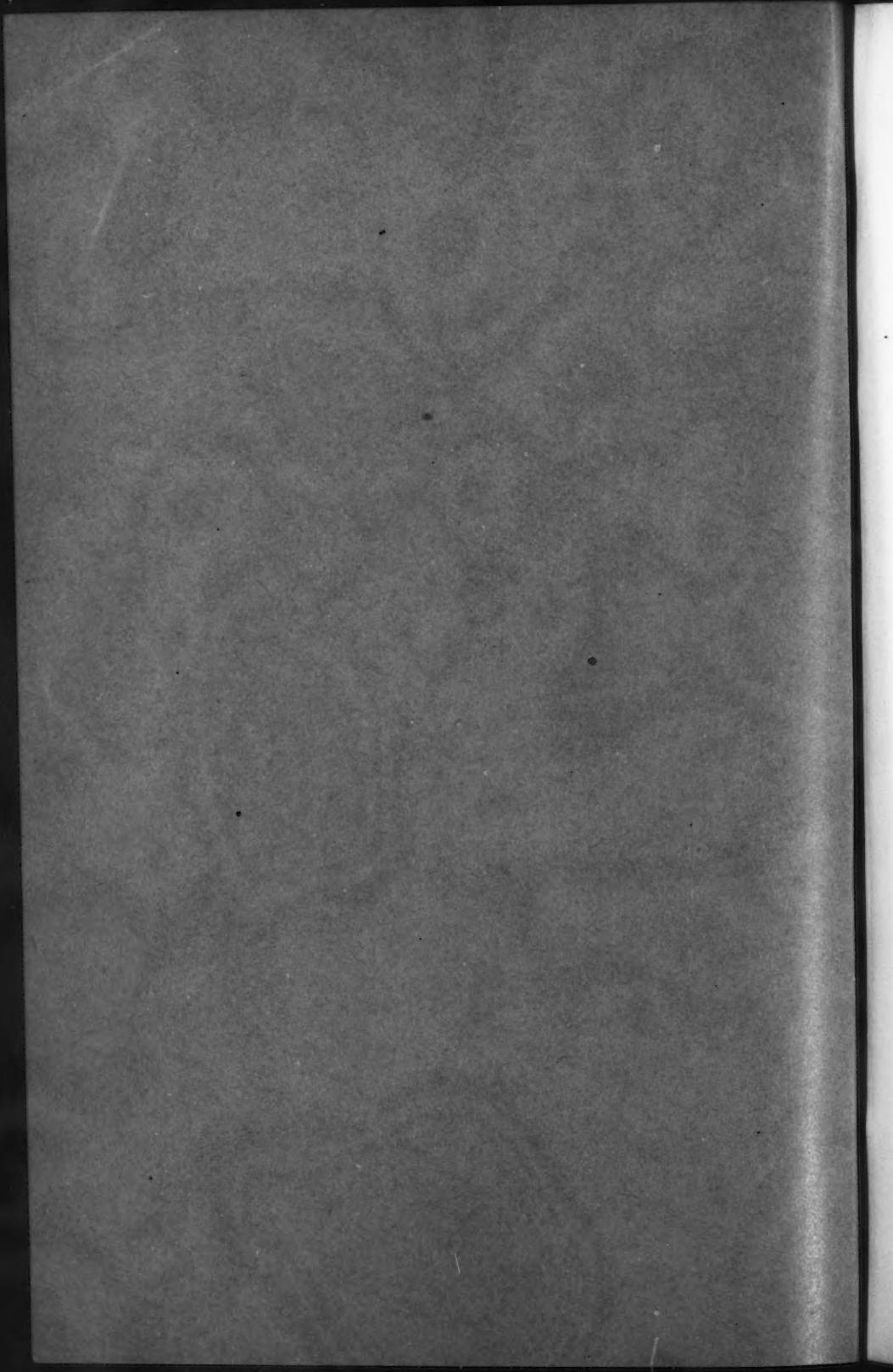
VOL. XLII—No. 8



October, 1916

Published at the House of the Society, 220 West Fifty-seventh Street, New York,
the Fourth Wednesday of each Month, except June and July.

Copyrighted 1916, by the American Society of Civil Engineers.
Entered as Second-Class Matter at the New York City Post Office, December 15th, 1896.
Subscription, \$8 per annum.



PROCEEDINGS

DEPARTMENT OF STATE

OF THE

AMERICAN SOCIETY

CIVIL ENGINEERS

(INSTITUTED 1852)

VOL. XLII—No. 8

OCTOBER, 1916

Edited by the Secretary, under the direction of the Committee on Publications.

Reprints from this publication, which is copyrighted, may be made on condition that the full title of Paper, name of Author, page reference, and date of presentation to the Society, are given.

CONTENTS

- | | |
|------------------------------------|----------------------------|
| Society Affairs..... | Pages 645 to 692. |
| Papers and Discussions..... | Pages 1815 to 1868. |

NEW YORK 1916

Entered, according to Act of Congress, in the year 1916, by the AMERICAN SOCIETY OF CIVIL ENGINEERS, in the office of the Librarian of Congress, at Washington.

American Society of Civil Engineers

OFFICERS FOR 1916

President, CLEMENS HERSCHEL

Vice-Presidents

Term expires January, 1917: DANIEL BONTECOU ALFRED CRAVEN
RICHARD MONTFORT PALMER C. RICKETTS

Secretary, CHARLES WARREN HUNT

Treasurer, LINCOLN BUSH

Directors

Term expires January, 1917:
GEORGE W. FULLER
ARTHUR S. TUTTLE
CHARLES H. KEEFER
MORTIMER E. COOLEY
EUGENE E. HASKELL
ISHAM RANDOLPH

Term expires January, 1918:
JOHN V. DAVIES
GEORGE A. HARWOOD
JOHN E. GREINER
JOHN F. COLEMAN
JOHN B. HAWLEY
HERBERT S. CROCKER

Term expires January, 1919:
VIRGIL G. BOGUE
ALEX. C. HUMPHREYS
OTIS F. CLAPP
RICHARD KHUEN
FRANK G. JONAH
EDWIN DURYEA, JR.

Assistant Secretary, T. J. McMINN

Standing Committees

(THE PRESIDENT OF THE SOCIETY IS *ex-officio* MEMBER OF ALL COMMITTEES)

On Finance:

GEORGE W. FULLER
ALFRED CRAVEN
VIRGIL G. BOGUE
OTIS F. CLAPP
FRANK G. JONAH

On Publications:

ARTHUR S. TUTTLE
VIRGIL G. BOGUE
ALEX. C. HUMPHREYS
JOHN E. GREINER
JOHN F. COLEMAN

On Library:

GEORGE A. HARWOOD
JOHN V. DAVIES
HERBERT S. CROCKER
MORTIMER E. COOLEY
CHAS. WARREN HUNT

Special Committees

ON CONCRETE AND REINFORCED CONCRETE: Joseph R. Worcester, J. E. Greiner, W. K. Hatt, Olaf Hoff, Richard L. Humphrey, Robert W. Lesley, Emil Swensson, A. N. Talbot.

ON ENGINEERING EDUCATION: Desmond FitzGerald, Onward Bates, D. W. Mead.

ON STEEL COLUMNS AND STRUTS: George H. Pegram, James H. Edwards, Clarence W. Hudson, Charles F. Loweth, Rudolph P. Miller, Ralph Modjeski, Frank C. Osborn, Lewis D. Rights, George F. Swain, Emil Swensson, Joseph R. Worcester.

ON MATERIALS FOR ROAD CONSTRUCTION: W. W. Crosby, A. W. Dean, H. K. Bishop, A. H. Blanchard, George W. Tillson, Nelson P. Lewis, Charles J. Tilden.

ON VALUATION OF PUBLIC UTILITIES: Frederic P. Stearns, Charles S. Churchill, Leonard Metcalf, William G. Raymond, Henry E. Riggs, Jonathan P. Snow, William J. Wilgus.

TO INVESTIGATE CONDITIONS OF EMPLOYMENT OF, AND COMPENSATION OF, CIVIL ENGINEERS: Nelson P. Lewis, S. L. F. Deyo, Dugald C. Jackson, William V. Judson, George W. Tillson, C. F. Loweth, John A. Bensel.

TO CODEFY PRESENT PRACTICE ON THE BEARING VALUE OF SOILS FOR FOUNDATIONS, ETC.: Robert A. Cummings, Edwin Duryea, Jr., E. G. Haines, Allen Hazen, James C. Meem, Walter J. Douglas.

ON A NATIONAL WATER LAW: F. H. Newell, W. C. Hoad, John H. Lewis.

TO REPORT ON STRESSES IN RAILROAD TRACK: A. N. Talbot, A. S. Baldwin, J. B. Berry, G. H. Bremer, John Brunner, W. J. Burton, Charles S. Churchill, W. C. Cushing, Robert W. Hunt, George W. Kittridge, Paul M. LaBach, C. G. E. Larsson, G. J. Ray, Albert F. Reichmann, H. R. Safford, F. E. Turneaure, J. E. Willoughby.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

HOUSE OF THE SOCIETY—220 WEST FIFTY-SEVENTH STREET, NEW YORK.

TELEPHONE NUMBER..... 1446 Circle.

CABLE ADDRESS..... "Ceas, New York."

AMERICAN SOCIETY OF CIVIL ENGINEERS

INSTITUTED 1852

PROCEEDINGS

**This Society is not responsible for any statement made or opinion expressed
in its publications.**

SOCIETY AFFAIRS

CONTENTS

	PAGE
Minutes of Meetings: Of the Society, September 20th, and October 4th, 1916.....	645
 Announcements:	
Hours during which the Society House is open.....	650
Future Meetings.....	650
List of Nominees for Offices to be Filled at the Annual Election, January 17th, 1917.....	650
Searches in the Library.....	650
Papers and Discussions.....	651
Local Associations of Members of the American Society of Civil Engineers.....	652
Minutes of Meetings of Special Committees.....	655
Privileges of Engineering Societies Extended to Members.....	655
 Accessions to the Library:	
Donations.....	658
 Membership (Additions, Changes of Address, Deaths):	
Recent Engineering Articles of Interest.....	661
	673

MINUTES OF MEETINGS

OF THE SOCIETY

September 20th, 1916.—The meeting was called to order at 8.30 p. m.; J. Waldo Smith, M. Am. Soc. C. E., in the chair; Chas. Warren Hunt, Secretary; and present, also, 202 members and 39 guests.

A paper by Israel V. Werbin, Assoc. M. Am. Soc. C. E., entitled "Tunnel Work on Sections 8, 9, 10, and 11, Broadway-Lexington Avenue Subway, New York City", was presented by the author and illustrated with lantern slides.

A communication on the subject by Maurice Griest, Esq., was read by the Secretary, and the paper was discussed by Messrs. T. Kennard Thomson, John H. Madden, Robert H. Jacobs, John H. Myers, H. G. Moulton, W. J. Boucher, Robert Ridgway, C. V. V. Powers, and the author.

The Secretary announced the election of the following candidates on September 12th, 1916:

As MEMBERS

- JAMES MURRAY BOYLE, New York City
JOHN LAFAYETTE BROWER, Toronto, Ont., Canada
JOHN RYAN BURKE, Boston, Mass.
JOHN CARSON, Duluth, Minn.
LOUIS RENO COBE, New York City
EDWARD KIRK COE, Duluth Minn.
JOACHIM GOTSCHE GIAVER, Chicago, Ill.
MEIER GEORGE HILPERT, Harrisburg, Pa.
WILLIAM HORATIO McALPINE, Louisville, Ky.
GEORGE BRAGG MASSEY, Chicago, Ill.
ARTHUR PAGE NOYES, San Francisco, Cal.
CHESTER NELSON REITZE, Seattle, Wash.
WILLIAM LINCOLN ROCKWELL, San Antonio, Tex.
ARTURO RODRIGUEZ, Ithaca, N. Y.
ERNEST GEORGE SCHURIG, Lincoln, Nebr.
FENWICK FENTON SKINNER, New York City
MILTON THEODORE THOMPSON, New York City
MIGUEL TRIANA, Bogota, Colombia
WILLIAM GORDON WOOLF, Chicago, Ill.

As ASSOCIATE MEMBERS

- JOHN WADDINGTON HARRY BARNES, Madera, Cal.
JOHN ARTHUR BEEMER, Boise, Idaho
CHARLES RENWICK BRECK, Jr., Anchorage, Alaska
HOWARD EDWARD BURNS, St. Louis, Mo.
CHARLES ALBERT CUMMINS, Baltimore, Md.
THOMAS AUSTIN CURRIE, Jr., Boston, Mass.
CHARLES HENRY DADING, Philadelphia, Pa.
WILLIAM EDWARD DAWSON, Dubuque, Iowa
WILLIAM DRISCOLL, Guantanamo, Cuba
ALLEN DOUGLAS DUCK, Greenville, Tex.
PHILIP NORRISON FAWCETT, Tientsin, China
VICTOR LEROY FIXEN, St. Paul, Minn.
ALEXANDER VINCENT GALLOGLY, New York City
WILLIAM RICHARD GELSTON, Quincy, Ill.
WILLIAM ALBERT GROVER, Dover, N. H.
JOHN LECHMORE GUPPY, Port of Spain, Trinidad
HERMAN HENRY HANINK, Palos Park, Ill.
HARLAN TYLEE HARE, Duluth, Minn.
CARL JAMES HERBOLD, Cleveland, Ohio
GEORGE MARTIN HOPKINSON, New York City

JOHN SPENCE HOWARD, Baltimore, Md.
 ARTHUR DAVID HYMAN, New York City
 NATHAN CLARKE JOHNSON, New York City
 EDWARD LINDLEY JONES, Evanston, Ill.
 EARL FOSTER KELLEY, Ames, Iowa
 PERCY MAPES LAU, Detroit, Mich.
 ALEXANDER ROSS LECKIE, Dallas, Tex.
 LEON RODERICK MACKENZIE, Chicago, Ill.
 JOHN JOSEPH McCABE, Troy, N. Y.
 WILLIAM LAMSON MCCARTY, Santo Domingo,
 Dominican Republic
 CARL ARTHUR MCCLAIN, Emerson, Iowa
 ERWIN MAEKER, Jackson, Mich.
 WILLIAM WHIPPLE MICHAEL, Wallkill, N. Y.
 JEWETT BEACH NEWTON, Boston, Mass.
 ALBERT COLWELL NORTON, Denver, Colo.
 SOLOMON RESWICK, Utica, N. Y.
 FRED DENNISTON SAYER, Brookville, Pa.
 JOHN GEORGE SCHMIDT, Norwood, Ohio
 JOHN ROCKWOOD SHERMAN, Meadow Creek, Wash.
 BENJAMIN ALVAN SLEEPER, Camden, N. J.
 CLARK DEE SNIGGS, Manila, Philippine Islands
 BURT STIMSON, Seattle, Wash.
 ARTHUR DUCAT STIVERS, Pittsburg, Tex.
 HORACE STRINGFELLOW, Alexandria, Va.
 JOSEPH C. THOMA, Salt Lake City, Utah
 MARTIN WILHELM TORKELSON, Madison, Wis.
 KELLS EMMETT TRAYLOR, Winona, Miss.
 WINSLOW BARNES WATSON, Albany, N. Y.
 WILFRED ASHENHURST WHITE, Portland, Ore.
 RUDOLPH JAMES WIG, Washington, D. C.

AS ASSOCIATES

ALBERT FARWELL BEMIS, Boston, Mass.
 HOWARD EMERSON CHURCH, Springfield, Mass.
 EDWARD KIMBALL FENNO, Syracuse, N. Y.
 ROY ARTIMUS MANWARING, Philadelphia, Pa.
 WILLIAM LEWIS STANCLIFFE, New York City

AS JUNIORS

HARRY SAMUEL ANDREWS, Jackson, Tenn.
 CLIFFORD AULL BETTS, Mariel, Cuba
 KENDAL BENJAMIN BRAGG, Dayton, Ohio
 GEORGE DASHIELL CAMP, Boston, Mass.

JAMES LESLIE CHEATHAM, New York City
 DONALD GLADSTONE COOMBS, Meadow Creek, Wash.
 ALBERTO DUPUY, Bogotá, Colombia
 BENJAMIN HURT HARDAWAY, JR., Whitney, N. C.
 WALTON HARRINGTON, Newark, N. J.
 GERALD BRANCH HOWARD, Nashville, Tenn.
 WILLIAM CLARK IRWIN, St. Louis, Mo.
 FRANCIS WHITTIER JOHNSON, New York City
 PHILIP WHEELER KNISKERN, Chicago, Ill.
 EDWARD ALOYSIUS SHORT, Grand Mere, Que., Canada
 RAY NEWHALL SPOONER, Brooklyn, N. Y.
 MAXIMILIAN STEINBERG, New York City
 GEORGE ALBERT TILTON, JR., Los Angeles, Cal.
 LLOYD WOOLSEY WEED, New York City
 WENDELL HOWARD WOOLWORTH, Hanover, N. H.

The Secretary announced the transfer of the following candidates on September 12th, 1916:

FROM ASSOCIATE MEMBER TO MEMBER

IRVING CLINTON BROWER, Evanston, Ill.
 RALPH HANEY BURKE, Chicago, Ill.
 CAMDEN PAGE FORTNEY, Pilcher, Ky.
 WILLIAM ISAAC NOLEN, Copperhill, Tenn.
 WILLIAM WATTERS PAGON, Baltimore, Md.
 CHARLES VICTOR SEASTONE, Madison, Wis.
 IRA OTIS THORLEY, Denver, Colo.
 HOWARD MOORE TURNER, Turners Falls, Mass.
 ACHILLE OCTAVE VAN SUETENDAEL, Albany, N. Y.

FROM JUNIOR TO ASSOCIATE MEMBER

HAROLD EATON BABBITT, Urbana, Ill.
 HERBERT SCANDLIN BATTIE, Atlanta, Ga.
 WILLIAM BLAIR BOYER, San Francisco, Cal.
 CHARLES FREDERICK BREITZKE, Boonton, N. J.
 CARLYLE HUGO BRYSON, Lima, Ohio
 ANTONIA CASTILLO Y GRAU, Cienfuegos, Cuba
 HOWARD FOSTER CLARK, San Francisco, Cal.
 JOHN RUSSELL DERRICK, Bluefield, W. Va.
 WILLIAM BULLARD DURANT, Turners Falls, Mass.
 ARTHUR LUDWIG ENGER, Tucson, Ariz.
 EDGAR DOW GILMAN, Minneapolis, Minn.
 STUART CHAPIN GODFREY, West Point, N. Y.
 PETER DAVIDSON GUNN HAMILTON, Needham, Mass.
 CHARLES ROYCE HAUKE, Harlem, Mont.

FRANK RAY HOWE, New York City
EDWIN HALL MARKS, West Point, N. Y.
WILLIAM GROVER MORRISON, Des Moines, Iowa
ALEXANDER STUART RUSSELL, Richmond, Cal.
CARL WILLIAM SCHEDLER, JR., Pittsburg, Cal.
HYMEN AARON SELTZER, St. Louis, Mo.
PETER SOO-HOO, Canton, China
GEORGE ERNEST STREHAN, New York City
JAMES ARTHUR THOMPSON, New York City
FREDERICK WILLIAMS, New London, Conn.
ALFRED DANIEL WOLFF, JR., Poughkeepsie, N. Y.

The Secretary announced the following deaths:

RICHARD PARKHURST BLOSS, of Mechanicsville, N. Y., elected Member, January 6th, 1904; died May 22d, 1916.

CHARLES ADOLPHUS CALDWELL, of Macon, Ga., elected Member, September 5th, 1911; died August 31st, 1916.

Adjourned.

October 4th, 1916.—The meeting was called to order at 8.30 P. M.; Director Arthur S. Tuttle in the chair; Chas. Warren Hunt, Secretary; and present, also, 141 members and 23 guests.

The minutes of the meeting of September 6th, 1916, were approved as printed in *Proceedings* for September, 1916.

A paper by H. de B. Parsons, M. Am. Soc. C. E., entitled "Underpinning Trinity Vestry Building for Subway Construction", was presented by the author and illustrated with lantern slides. A communication on the subject from J. C. Meem, M. Am. Soc. C. E., was read by the Secretary, and the paper was discussed by Messrs. T. Kennard Thomson, James F. Fouhy, Charles Rufus Harte, Joseph A. A. Connelly, J. S. Branne, A. W. Buel, and the author.

The Secretary announced the following deaths:

FRANK McMILLAN STANTON, of New York City, elected Member, February 1st, 1899; died September 11th, 1916.

ROBERT HAMMOND BOYNTON, of Frankfort, Ind., elected Junior, May 6th, 1914; Associate Member, April 18th, 1916; died September 18th, 1916.

Adjourned.

SEARCHES IN THE LIBRARY
In the library, soon before 1905 the Society was authorized to make copies of its publications for the use of its members. Since that time the Society has been engaged in the preparation of a new library, and it is now in the process of being completed. The new library will be located in the basement of the new building, and it is expected to be ready for use in the fall of 1916. The new library will be open to all members of the Society, and it is hoped that it will be a valuable addition to the existing facilities of the Society.

ANNOUNCEMENTS

The House of the Society is open from 9 A. M. to 10 P. M., every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

FUTURE MEETINGS

November 1st, 1916.—8.30 P. M.—A regular business meeting will be held, and a paper by F. H. Peters, Assoc. M. Am. Soc. C. E., entitled "A Complete Method for the Classification of Irrigable Lands", will be presented for discussion.

This paper was printed in *Proceedings* for September, 1916.

November 15th, 1916.—8.30 P. M.—At this meeting a paper by Charles A. Ferry, M. Am. Soc. C. E., entitled "The Yale Bowl", will be presented for discussion.

This paper is printed in this number of *Proceedings*.

LIST OF NOMINEES FOR THE OFFICES TO BE FILLED AT THE ANNUAL ELECTION, JANUARY 17th, 1917

The list of nominees for the offices to be filled at the Annual Meeting, January 17th, 1917, was received from the Nominating Committee. The nominee for the office of President, having declined the nomination, the Board of Direction, at its meeting on October 10th, 1916, selected a nominee, completing the list in accordance with Art. VII, Sec. 3, of the Constitution. The list has already been mailed to all Corporate Members:

For President to serve one year:

GEORGE H. PEGRAM, New York City.

For Vice-Presidents to serve two years:

GEORGE W. KITTREDGE, New York City.

GEORGE S. WEBSTER, Philadelphia, Pa.

For Treasurer to serve one year:

GEORGE W. TILLSON, Brooklyn, N. Y.

For Directors to serve three years:

ALFRED D. FLINN, New York City.....	District No. 1
LEWIS D. RIGHTS, New York City.....	District No. 1
WILLIAM R. HILL, Albany, N. Y.....	District No. 3
ARTHUR P. DAVIS, Washington, D. C.....	District No. 5
W. L. DARLING, St. Paul, Minn.....	District No. 7
R. H. THOMSON, Seattle, Wash.....	District No. 12

SEARCHES IN THE LIBRARY

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

It sometimes happens that references are found which are not readily accessible to the person for whom the search is made. In that case the material may be reproduced by photography, and this can be done for members at the cost of the work to the Society, which is small. This method is particularly useful when there are drawings or figures in the text, which would be very expensive to reproduce by hand.

PAPERS AND DISCUSSIONS

Members and others who take part in the oral discussions of the papers presented are urged to revise their remarks promptly. Written communications from those who cannot attend the meetings should be sent in at the earliest possible date after the issue of a paper in *Proceedings*.

All papers accepted by the Publication Committee are classified by the Committee with respect to their availability for discussion at meetings.

Papers which, from their general nature, appear to be of a character suitable for oral discussion, will be published as heretofore in *Proceedings*, and set down for presentation to a future meeting of the Society, and on these, oral discussions, as well as written communications, will be solicited.

All papers which do not come under this heading, that is to say, those which, from their mathematical or technical nature, in the opinion of the Committee, are not adapted to oral discussion, will not be scheduled for presentation to any meeting. Such papers will be published in *Proceedings* in the same manner as those which are to be presented at meetings, but written discussions only will be requested for subsequent publication in *Proceedings* and with the paper in the volumes of *Transactions*.

The Board of Direction has adopted rules for the preparation and presentation of papers, which will be found on page 429 of the August, 1913, *Proceedings*.

**LOCAL ASSOCIATIONS OF MEMBERS
OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS****San Francisco Association, Organized 1905.**

President, H. L. Haehl; Secretary, E. T. Thurston, 57 Post Street, San Francisco, Cal.

The San Francisco Association of Members of the American Society of Civil Engineers holds regular bi-monthly meetings, with banquet, and weekly informal luncheons. The former are held at 6 P. M., at the Palace Hotel, on the third Tuesday of February, April, June, August, and October, and the third Friday of December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.15 P. M., every Wednesday, and the place of meeting may be ascertained by communicating with the Secretary.

Colorado Association, Organized 1908.

President, Thomas W. Jaycox; Secretary-Treasurer, L. R. Hinman, 1400 West Colfax Avenue, Denver, Colo.

The meetings of the Colorado Association of Members of the American Society of Civil Engineers (Denver, Colo.) are held on the second Saturday of each month, except July and August. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary. The meetings are usually preceded by an informal dinner. Members of the American Society of Civil Engineers will be welcomed at these meetings.

Weekly luncheons are held on Wednesdays at 12.30 P. M., at Daniel's and Fisher's.

Visiting members are urged to attend the meetings and luncheons.

(Abstract of Minutes of Meeting)

June 10th, 1916.—The Eighth Annual Meeting was called to order at The Denver Athletic Club; President John E. Field in the chair; L. R. Hinman, Secretary; and present, also, 30 members and 25 guests.

The minutes of the meeting of May 13th, 1916, were read and approved.

President Field presented an address on "The Engineer in the Business World".

The Reports of the Secretary-Treasurer, the Auditing Committee, and the Nominating Committee, were presented. On motion, duly seconded, the reports were accepted and ordered placed on file, and the Committees were discharged.

Messrs. W. L. Reynolds, C. S. Lambie, and R. W. Toll were appointed Tellers to canvass the ballots for officers for 1916-17.

Mr. T. B. Stearns addressed the meeting on the work of the Local Committee in connection with the National Industrial Preparedness Board.

The Secretary read the resolutions adopted by the Baltimore Association in the matter of appropriations for the use of the Maryland Board of Directors on Industrial Preparedness.

Attorney-General Farrar, State of Colorado, addressed the meeting, commenting on statements made by President Field in his address.

1916, Proceedings

The Secretary announced the purchase of a stereopticon for the use of the Association.

On the report of the Tellers, the following officers were declared elected: President, Thomas W. Jaycox; Vice-President, Robert Folansbee; Secretary-Treasurer, L. R. Hinman.

J. B. Lippincott, M. Am. Soc. C. E., presented a paper on "The Construction and Operation of the Los Angeles Aqueduct", illustrating his remarks with lantern slides. A vote of thanks was tendered Mr. Lippincott for his interesting paper.

Adjourned.

Atlanta Association, Organized 1912.

President, Paul H. Norcross; Secretary-Treasurer, Thomas P. Branch, Georgia School of Technology, Atlanta, Ga.

The Association holds its meetings at the University Club, Atlanta, Ga. Regular monthly luncheon meetings are held to which visiting members of the Society are always welcome.

Baltimore Association, Organized 1914.

President, H. D. Bush; Secretary-Treasurer, Charles J. Tilden, The Johns Hopkins University, Baltimore, Md.

Cleveland Association, Organized 1914.

President, Robert Hoffmann; Secretary-Treasurer, George H. Tinker, Hickox Building, Cleveland, Ohio.

District of Columbia Association, Organized 1916.

President, A. P. Davis; Secretary-Treasurer, John C. Hoyt, U. S. Geological Survey, Washington, D. C.

Illinois Association, Organized 1916.

President, Onward Bates; Secretary-Treasurer, E. N. Layfield, 4251 Vincennes Avenue, Chicago, Ill.

The regular meetings of the Association are held on the second Monday of March, June, September, and December, the last being the Annual Meeting. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary.

Louisiana Association, Organized 1914.

President, W. B. Gregory; Secretary, Charles W. Okey, Tulane University, New Orleans, La.

The regular meetings of the Association are held at The Cabildo, New Orleans, La., on the first Monday of January, April, July, and October.

Northwestern Association, Organized 1914.

President, W. L. Darling; Secretary, Ralph D. Thomas, Minneapolis, Minn.

Philadelphia Association, Organized 1913.

President, Edward B. Temple; Secretary, W. L. Stevenson, 412 City Hall, Philadelphia, Pa.

The regular meetings of the Association are held at the Engineers'

Club of Philadelphia, 1317 Spruce Street, on the first Monday in January, April, and October, the last being the Annual Meeting.

Portland, Ore., Association, Organized 1913.

President, J. P. Newell; Secretary, J. A. Currey, 194 North 13th Street, Portland, Ore.

St. Louis Association, Organized 1914.

President, J. A. Ockerson; Secretary-Treasurer, Gurdon G. Black, 34 East Grand Avenue, St. Louis, Mo.

The meetings of the Association are held at the Engineers' Club Auditorium. The Annual Meeting is held on the fourth Monday in November. The time of other meetings is not fixed, but this information will be furnished on application to the Secretary.

San Diego Association, Organized 1915.

President, N. B. Kellogg; Secretary-Treasurer, J. R. Comly, 4105 Falcon Street, San Diego, Cal.

Seattle Association, Organized 1913.

President, A. O. Powell; Secretary-Treasurer, Carl H. Reeves, 4722 Latona Avenue, Seattle, Wash.

The regular meetings of the Association are held at 12.15 P. M., on the last Monday of each month, at The Northold Inn, 212 University Street.

Southern California Association, Organized 1914.

President William Mulholland; Secretary, W. K. Barnard, 1105 Central Building, Los Angeles, Cal.

The Southern California Association of Members of the American Society of Civil Engineers (Los Angeles, Cal.) holds regular bi-monthly meetings, with banquet, at Hotel Clark, on the second Wednesday of February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.15 P. M. every Wednesday, and the place of meeting may be ascertained from the Secretary.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in Los Angeles, and any such member will be gladly welcomed as a guest at any of the meetings or luncheons.

Spokane Association, Organized 1914.

President, Ulysses B. Hough; Secretary, A. D. Butler, Spokane, Wash.

Texas Association, Organized 1913.

President, John B. Hawley; Secretary, J. F. Witt, Dallas, Tex.

Utah Association, Organized 1916.

President, E. C. La Rue; Secretary-Treasurer, H. S. Kleinschmidt, 306 Dooley Building, Salt Lake City, Utah.

**MINUTES OF MEETINGS OF
SPECIAL COMMITTEES**

TO REPORT UPON ENGINEERING SUBJECTS

Special Committee on Materials for Road Construction

September 23d, 1916.—The meeting was called to order at the House of the Society. Present, George W. Tillson (Chairman, *pro tem.*), H. K. Bishop, A. W. Dean, Nelson P. Lewis, Charles J. Tilden, and A. H. Blanchard (Secretary).

The minutes of the meeting of July 8th, 1916, were read and approved.

The following sections of the 1917 Report were presented, discussed, and tentatively adopted: Gravel Roads, by Mr. Bishop; Broken Stone Roads, Broken Stone Roads with Bituminous Surfaces, and Bituminous Macadam Pavements, by Mr. Dean; Asphalt Block Pavements, Sheet-Ashphalt Pavements, and Joints and Expansion-Contraction Joints under General Conclusions, by Mr. Blanchard; and Cement-Concrete Pavements, by Mr. Tilden.

On motion, the Committee adjourned to meet on October 21st, 1916.

PRIVILEGES OF ENGINEERING SOCIETIES

EXTENDED TO MEMBERS OF THE

AMERICAN SOCIETY OF CIVIL ENGINEERS

Members of the American Society of Civil Engineers will be welcomed by the following Engineering Societies, both to the use of their Reading Rooms, and at all meetings:

American Institute of Electrical Engineers, 33 West Thirty-ninth Street, New York City.

American Institute of Mining Engineers, 29 West Thirty-ninth Street, New York City.

American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York City.

Architekten-Verein zu Berlin, Wilhelmstrasse 92, Berlin W. 66, Germany.

Associação dos Engenheiros Civis Portugueses, Lisbon, Portugal.

Australasian Institute of Mining Engineers, Melbourne, Victoria, Australia.

Boston Society of Civil Engineers, 715 Tremont Temple, Boston, Mass.

Brooklyn Engineers' Club, 117 Remsen Street, Brooklyn, N. Y.

Canadian Society of Civil Engineers, 176 Mansfield Street, Montreal, Que., Canada.

Civil Engineers' Society of St. Paul, St. Paul, Minn.

Cleveland Engineering Society, Chamber of Commerce Building, Cleveland, Ohio.

Cleveland Institute of Engineers, Middlesbrough, England.

- Dansk Ingeniorforening**, Amaliegade 38, Copenhagen, Denmark.
- Detroit Engineering Society**, 46 Grand River Avenue, West, Detroit, Mich.
- Engineers and Architects Club of Louisville**, 1412 Starks Building, Louisville, Ky.
- Engineers' Club of Baltimore**, 6 West Eager Street, Baltimore, Md.
- Engineers' Club of Kansas City**, E. B. Murray, Secretary, 920 Walnut Street, Kansas City, Mo.
- Engineers' Club of Minneapolis**, 17 South Sixth Street, Minneapolis, Minn.
- Engineers' Club of Philadelphia**, 1317 Spruce Street, Philadelphia, Pa.
- Engineers' Club of St. Louis**, 3817 Olive Street, St. Louis, Mo.
- Engineers' Club of Toronto**, 96 King Street, West, Toronto, Ont., Canada.
- Engineers' Club of Trenton**, Trent Theatre Building, 12 North Warren Street, Trenton, N. J.
- Engineers' Society of Northeastern Pennsylvania**, 415 Washington Avenue, Scranton, Pa.
- Engineers' Society of Pennsylvania**, 31 South Front Street, Harrisburg, Pa.
- Engineers' Society of Western Pennsylvania**, 2511 Oliver Building, Pittsburgh, Pa.
- Institute of Marine Engineers**, The Minories, Tower Hill, London, E., England.
- Institution of Engineers of the River Plate**, Calle 25 de Mayo 195, Buenos Aires, Argentine Republic.
- Institution of Naval Architects**, 5 Adelphi Terrace, London, W. C., England.
- Junior Institution of Engineers**, 39 Victoria Street, Westminster, S. W., London, England.
- Koninklijk Instituut van Ingenieurs**, The Hague, The Netherlands.
- Louisiana Engineering Society**, State Museum Building, Chartres and St. Ann Streets, New Orleans, La.
- Memphis Engineers' Club**, Memphis, Tenn.
- Midland Institute of Mining, Civil and Mechanical Engineers**, Sheffield, England.
- Montana Society of Engineers**, Butte, Mont.
- North of England Institute of Mining and Mechanical Engineers**, Newcastle-upon-Tyne, England.
- Oesterreichischer Ingenieur- und Architekten-Verein**, Eschenbachgasse 9, Vienna, Austria.
- Oregon Society of Civil Engineers**, Portland, Ore.
- Pacific Northwest Society of Engineers**, 312 Central Building, Seattle, Wash.
- Rochester Engineering Society**, Rochester, N. Y.

Sachsische Ingenieur- und Architekten-Verein, Dresden, Germany.

Sociedad Colombiana de Ingenieros, Bogota, Colombia.

Sociedad de Ingenieros del Peru, Lima, Peru.

Societe des Ingénieurs Civils de France, 19 rue Blanche, Paris, France.

Society of Engineers, 17 Victoria Street, Westminster, S. W., London, England.

Svenska Teknologforeningen, Brunkebergstorg 18, Stockholm, Sweden.

Tekniske Forening, Vestre Boulevard 18-1, Copenhagen, Denmark.

Vermont Society of Engineers, George A. Reed, Secretary, Montpelier, Vt.

Western Society of Engineers, 1737 Monadnock Block, Chicago, Ill.

ACCESSIONS TO THE LIBRARY

(From September 6th to October 3d, 1916)

DONATIONS*

EXAMPLES IN ALTERNATING-CURRENTS; VOL. II.

By F. E. Austin. Second Edition, with Additions. Leather, 7 x 5 in., illus. 223 pp. Hanover, N. H., F. E. Austin, 1916. \$2.40. (Donated by the Author.)

The popular demand for this work, as stated in the preface, has made the second edition necessary. The book has been designed to assist the college student, to act as a guide in the solution of engineering problems, and also, it is said, will be of value to teachers and to those who are studying the subject independently. One of its important features, it is stated, consists of various tables containing values of variable quantities met with in engineering practice, so arranged as to include a wide range of values and to render evaluation convenient and rapid. There is an index of seven pages.

THE PLANNING OF THE MODERN CITY:

A Review of the Principles Governing City Planning. By Nelson P. Lewis, M. Am. Soc. C. E. Cloth, 9 $\frac{1}{4}$ x 6 $\frac{1}{2}$ in., illus., 15 + 423 pp. New York, John Wiley & Sons, Inc.; London, Chapman & Hall, Limited, 1916. \$3.50. (Donated by the Author.)

This book is devoted entirely to the engineering aspects of city planning, or to city planning as an engineering problem or group of problems, and the subjects discussed herein are those with which the engineer who is responsible for the working out of a general plan for a city or for successive additions to an existing city, should be familiar. As there is no undertaking which demands more careful study of what has happened elsewhere, what is likely to happen in a particular place, and the development of tendencies which are sure to result in changes in methods of living and of conducting business, as city planning, the author hopes that municipal engineers will find this book of value in bringing to them a keener realization of their part in, and responsibility for, that work. The subject-matter is illustrated fully with photographs and diagrams and plans, showing what has recently been done and what is being planned and executed at the present time, in the way of city planning, in the United States, Europe, and South America. The Contents are: Introductory; The City Planning Movement; The Correction of Mistakes; Elements of a City Plan; The Transportation System; The Street System; Parks and Recreation Facilities; Public Buildings and Civic Centers; The Economic Value of a City Plan; The Industrial Town or District; Street Traffic; Street Details—Utility and Adornment; The Railroad in Its Relation to the Street System; Restrictions; The Environs of the City; Garden Cities; City Planning Legislation; Progress and Methods; Financing a City Plan; Municipal Land Policies; The Opportunities and Responsibilities of the Municipal Engineer; Sources of Information; Index.

STRESSES IN STRUCTURES.

By A. H. Heller. Revised by Clyde T. Morris, M. Am. Soc. C. E. Third Edition. Cloth, 9 $\frac{1}{4}$ x 6 $\frac{1}{2}$ in., illus., 18 + 374 pp. New York, John Wiley & Sons, Inc.; London, Chapman & Hall, Limited, 1916. \$2.75.

The first edition of this book was published in 1905, and in the preface to that edition, it is stated that the author's aim was to supply, in one volume, a textbook covering stresses in all forms of simple trusses, which would also serve as a reference book for the practicing engineer. In the preface to the third edition, it is said that the explanations contained in the text have been expanded, numerous examples have been given to illustrate the methods used, and many of the figures have been re-drawn and new ones added. Chapters V and VI have been combined to be Chapter V which includes an explanation of Bow's notation and a new article on derricks. Chapter IX has been expanded into two chapters, X on Roof Trusses and XI on Bridge Trusses. In Chapter XII, solutions have been added for the deck Pratt, subdivided Warren,

* Unless otherwise specified, books in this list have been donated by the publishers.

Whipple, and Pettit trusses, and skew bridges. In Chapter XIII, a complete solution of the stresses in a Pratt truss railroad bridge from wheel loads is added and a moment table is given for Cooper's loading, and in Chapter XIV a more complete explanation is given of the solution of the stresses in bridges with curved track. At the end of each chapter are questions and problems referring to the subject discussed in that chapter. The Contents are: Stresses and Deformations Within the Elastic Limits; Stresses and Deformations Beyond the Elastic Limit; The Laws of Equilibrium and Their Application; Application of the Laws of Equilibrium to the Structure as a Whole; Reactions; Application of the Laws of Equilibrium to a Part of a Structure; Stresses; Stresses in Beams and Girders; Deflections of Beams and Girders; Special Cases of Beams and Girders Loaded and Supported in Different Ways; Stresses in Blocks and Columns; Roof Trusses; Bridge Trusses; Stresses in Simple Bridge Trusses for Uniform Loads; Stresses in Railway Bridges from Wheel Loads; Stresses in Bridges from Horizontal Forces; Index.

Gifts have also been received from the following:

- Alaskan Eng. Comm. 2 vol.
 Am. Inst. of Chemical Engrs. 1 pam.
 Am. Iron and Steel Inst. 1 pam.
 Am. Soc. for Testing Materials. 1 vol.
 Am. Telephone & Telegraph Co. 1 vol.
 Assoc. of Transportation and Car Accounting Officers. 1 vol.
 Australia-Commonwealth Bureau of Census and Statistics. 1 bound vol., 1 pam.
 Bombay Presidency, India-Public Works Dept. 1 vol.
 Brisbane, Queensland-Met. Water Supply and Sewerage Board. 1 pam.
 Brooklyn Engrs. Club. 1 bound vol.
 Canada-Geo. Survey. 1 vol.
 Canada-Mines Branch. 1 pam.
 Canada-Water Power Branch. 1 vol.
 Canadian Northern Ry. System. 1 pam.
 Carnegie Endowment for Inter. Peace. 1 bound vol.
 Chicago & North Western Ry. Co. 1 pam.
 Chicago, Milwaukee & St. Paul Ry. Co. 1 pam.
 Chicago, St. Paul, Minneapolis & Omaha Ry. Co. 1 pam.
 Chosen, Japan-Ry. Bureau of the Govt.-Gen. 1 vol.
 Colorado Assoc. of Members of the Am. Soc. of Clv. Engrs. 1 pam.
 Denver & Rio Grande R. R. Co. 1 pam.
 Egyptian Delta Light Rys. Co., Ltd. 1 pam.
 Eng. Assoc. of New South Wales. 1 bound vol.
 Engrs.' Club of Kansas City. 1 pam.
 Fitchburg, R. R. Co. 1 pam.
 Fletcher, Duncan U. 1 pam.
 Florida-State Board of Health. 1 bound vol.
 Hanover Kgl. Technische Hochschule. 1 pam.
 Hyde, C. G. 2 pam.
 Institution of Clv. Engrs. 1 bound vol.
 Inter. Eng. Congress. 1 pam.
 Iowa-Executive Council. 1 pam.
 Iowa-State Mine Inspectors. 1 pam.
 Iowa Eng. Soc. 2 pam.
 Iron and Steel Inst. 1 bound vol.
 Jennings, Hennen. 1 pam.
 Kentucky-R. R. Comm. 2 bound vol.
 La Follette, R. M. 1 pam.
 London, England-Croydon Borough Council. 2 bound vol.
 London, England-Shoreditch Borough Council. 1 bound vol.
 Maine Central R. R. Co. 1 pam.
 Marshall County, Miss.-Marlanna Road District Comm. 1 pam.
 Merchants' Assoc. of New York. 1 vol., 1 pam.
 Michigan Coll. of Mines. 1 pam.
 Michigan Eng. Soc. 1 pam.
 Minneapolis, St. Paul & Sault Ste. Marie Ry. Co. 1 pam.
 Minnesota, Univ. of. 1 pam.
 Missouri, Univ. of-School of Mines and Metallurgy. 2 pam.
 National Assoc. of Cotton Mfrs. 1 bound vol.
 New England Water Works Assoc. 1 pam.
 New Jersey-Public Utility Commrs. 2 bound vol.
 New Mexico-State Corporation Comm. 1 bound vol.
 New South Wales-Chf. Commr. of Rys. and Tramways. 1 pam.
 New York City-Board of Water Supply. 1 bound vol., 2 pam.
 New York City-Comr. of Taxes and Assessments. 2 bound vol.
 New York State-Civil Service Comm. 1 bound vol.
 New York State-Public Service Comm. First Dist. 1 bound vol.
 New York State-Public Service Comm., Second Dist. 1 bound vol.
 New York-State Comptroller. 1 vol.
 New York-State Engr. and Surveyor. 1 bound vol.
 New York, Ontario & Western Ry. Co. 1 pam.
 New York Railroad Club. 1 pam.
 Norfolk & Western Ry. Co. 1 pam.
 Ohio Soc. of Mech., Elec. and Steam Engrs. 1 pam.
 Omaha, Nebr.-Dept. of Accounts and Finance. 1 vol.
 Pennsylvania-Public Service Comm. 7 pam.
 Philippine Islands-Weather Bureau. 1 vol.
 Quebec, Canada-Mines Branch. 1 vol.
 Sacramento, Cal.-Mayor. 1 vol.
 St. Louis, Mo.-Water Commr. 1 vol.
 Salt Lake City, Utah-City Commrs. 1 bound vol., 1 pam.
 Stuart, Inglis. 3 pam.
 Switzerland-Abteilung für Landeshydrographie. 1 vol.
 Switzerland-Abteilung für Wasserwirtschaft. 1 vol.
 Sydney, New South Wales-Dept. of Public Works. 1 bound vol.
 U. S.-Bureau of Mines. 7 pam.
 U. S.-Bureau of Standards. 2 pam.
 U. S.-Bureau of the Census. 1 bound vol.
 U. S.-Dept. of Agriculture. 4 pam.

- U. S.-Engr. Corps. 1 pamphlet.
 U. S.-Federal Horticultural Board. 1 pamphlet.
 U. S.-Geol. Survey. 1 volume, 34 pamphlets.
 U. S.-National Museum. 1 bound volume, 1 pamphlet.
 U. S.-Office of Markets and Rural Organization. 1 pamphlet.
 U. S.-Reclamation Service. 4 pamphlets.
 Universidad Nacional de la Plata. 2 pamphlets.
- University Club. 1 bound volume.
 Vermont Soc. of Engrs. 1 pamphlet.
 Virginia-Geol. Survey. 1 volume.
 Virginia-State Corporation Comm. 1 bound volume.
 Waddell, J. A. L. 1 pamphlet.
 Washington Irrig. Inst. 1 pamphlet.
 West Newton, Mass.-City Engr. 1 pamphlet.
 Western Soc. of Engrs. 1 pamphlet.

SUMMARY OF ACCESSIONS

(From September 6th to October 3d, 1916)

Donations (including 1 duplicate)..... 166

MEMBERSHIP

(From September 8th to October 5th, 1916)

ADDITIONS

MEMBERS	Date of Membership.
BOYLE, JAMES MURRAY. Executive Engr., Sanderson & Porter, 52 William St., New York City.....	Sept. 12, 1916
BROWER, IRVING CLINTON. Commr. of Public Works, City Hall, Evanston, Ill.....	Assoc. M. Nov. 30, 1909
BROWN, WILLIAM EDWIN. Res. Engr., East River Tunnels, Public Service Comm., First Dist., 400 East 21st St., Brooklyn, N. Y.....	M. Sept. 12, 1916
BURKE, RALPH HANEY. Chf. Engr., Illinois Waterway Comm., 1104 Peoples Life Bldg., Chicago, Ill.....	Jun. 1906
CARSON, JOHN. Chf. Engr., Duluth Street Ry., 1927 West 3d St., Duluth, Minn.....	Dec. 4, 1906
COBB, LOUIS RENO. Reinforced Concrete Designing Engr., Westinghouse, Church, Kerr & Co., 37 Wall St., New York City.....	Assoc. M. Oct. 4, 1910
FORTNEY, CAMDEN PAGE. Asst. Engr., U. S. Engr. Office, Dam 43, Ohio River, Picher, Ky.....	Assoc. M. Sept. 12, 1916
HILPERT, MEIER GEORGE. P. O. Box 754, Harrisburg, Pa..	Sept. 12, 1916
JOHNSON, CHARLES. 7925 Sycamore St., New Orleans, La.....	Assoc. M. Feb. 28, 1911
MCALPINE, WILLIAM HORATIO. Asst. Engr., U. S. Engr. Dept., P. O. Box 72, Louisville, Ky.....	Mar. 14, 1916
MASSEY, GEORGE BRAGG. Cons. Engr. (Geo. B. Massey Co.), Peoples Gas Bldg., Chicago, Ill.....	Sept. 12, 1916
NOLEN, WILLIAM ISAAC. Asst. Chf. Engr., Tennessee Copper Co., Copperhill, Tenn.....	Assoc. M. May 3, 1910
PAGON, WILLIAM WATTERS. Cons. Engr. (J. E. Greiner & Co.), 1319 Fidelity Bldg. (Res., 39th and Oak Sts.), Baltimore, Md.....	Assoc. M. Sept. 12, 1916
REITZE, CHESTER NELSON. Cons. Engr. (Reitzel, Storey & Duffy, Inc.), 803 Northern Bank Bldg., Seattle, Wash.....	Sept. 12, 1916
ROCKWELL, WILLIAM LINCOLN. With Irrig. Investigations, U. S. Dept. of Agriculture, 337 Federal Bldg., San Antonio, Tex.....	Sept. 12, 1916
RODRIGUEZ, ARTURO. Cons. and Contr. Engr., 308 West Seneca St., Ithaca, N. Y.....	Sept. 12, 1916
SCHURIG, ERNEST GEORGE. Supt. of Constr., U. S. Treasury Dept., Newark, Ohio.....	Sept. 12, 1916
SEASTONE, CHARLES VICTOR. Cons. Engr., 530 State St., Madison, Wis.....	Assoc. M. Dec. 5, 1906
	Sept. 12, 1916

MEMBERS (*Continued*)

		Date of Membership.
SHERRON, GEORGE AUSTIN. City Engr. and Street Commr., 4 Delaware St., Norwalk, Conn.	{ Assoc. M. M.	Sept. 2, 1914 June 24, 1916
SKINNER, FENWICK FENTON. (F. F. Skinner & Co.), 21 Park Row, Room 1705, New York City.		Sept. 12, 1916
THORLEY, IRA OTIS. 310 Congress Bldg., Detroit, Mich.	{ Assoc. M. M.	Oct. 29, 1912 Sept. 12, 1916
TURNER, HOWARD MOORE. Hydr. Engr., Turners Falls Power & Elec. Co., Turners Falls, Mass.	{ Assoc. M. M.	April 1, 1914 Sept. 12, 1916
VAN SUETENDAEL, ACHILLE OCTAVE. Chf. Structural Engr., Dept. of State Architecture, New York State, 101 Lancaster St., Albany, N. Y.	{ Jun. Assoc. M. M.	Jan. 3, 1905 June 3, 1908 Sept. 12, 1916
WARD, THOMAS ROBERT JOHN. Chf. Engr. and Secy. to the Govt. of the Punjab, Irrig. Branch, Public Works Dept., Simla, India.		June 23, 1916
WATSON, ROBERT MALCOLM. Gen. Municipal Engr. (Wise & Watson); Borough Engr., Rutherford and North Arlington, 46 Ridge Rd., Rutherford, N. J.		April 18, 1916
WOOLFOLK, WILLIAM GORDON. Mgr., Chicago Office, Sanderson & Porter, 72 West Adams St., Chicago, Ill.		Sept. 12, 1916
ASSOCIATE MEMBERS		
BABBITT, HAROLD EATON. Instr., Municipal and San. Eng., Univ. of Illinois, 907 West Oregon St., Urbana, Ill.	{ Jun. Assoc. M.	April 2, 1912 Sept. 12, 1916
BARNES, JOHN WADDINGTON HARRY. Engr., Madera Canal & Irrig. Co., Box 111, Madera, Cal.		Sept. 12, 1916
BATTIE, HERBERT SCANDLIN. Care, S. Risler, Am. Bridge Co., Gary, Ind.	{ Jun. Assoc. M.	Dec. 1, 1908 Sept. 12, 1916
BERGAN, THOMAS BERNARD. City Engr., Auburn, N. Y.		April 18, 1916
BOYER, WILLIAM BLAIR. Asst. City Engr., 760 Eighth Ave., San Francisco, Cal.	{ Jun. Assoc. M.	Oct. 1, 1913 Sept. 12, 1916
BREITZKE, CHARLES FREDERICK. San. Engr., Bureau of Water, Dept. of Streets and Public Impvts. of Jersey City, Boonton, N. J.	{ Jun. Assoc. M.	Dec. 3, 1907 Sept. 12, 1916
BRYSON, CARLYLE HUGO. City Engr., Lima, Ohio.	{ Jun. Assoc. M.	Mar. 2, 1915 Sept. 12, 1916
CADWALLADER, WALLACE LAIRD. With R. D. Coombs & Co., 30 Church St., Room 236 E, New York City.	{ Jun. Assoc. M.	Sept. 6, 1910 May 31, 1916
CLARK, HOWARD FOSTER. Asst. Engr., Hydr. Dept., R. R. Comm. of California, 833 Market St., San Francisco, Cal.	{ Jun. Assoc. M.	Dec. 2, 1914 Sept. 12, 1916

	ASSOCIATE MEMBERS (<i>Continued</i>)	Date of Membership.
CLAUSNITZER, JOHN. Archt. and Engr., 272 Third Ave., New York City.....	{ Assoc. M.	Mar. 3, 1903 April 18, 1916
CUMMINS, CHARLES ALBERT. Vice-Pres. and Gen. Mgr., Consolidated Eng. Co., 243 Calvert Bldg., Baltimore, Md.....	{	Sept. 12, 1916
CURRIE, THOMAS AUSTIN, JR. With Stone & Webster Eng. Corporation, 69 Gainsborough St., Suite 6, Boston, Mass.....	{	Sept. 12, 1916
DADING, CHARLES HENRY. Structural Engr. and Estimator, James H. Wells, 69 West Manheim St., Germantown, Philadelphia, Pa.....	{	Sept. 12, 1916
DRISCOLL, WILLIAM. Care, Guantanamo & Western R. R., Guantanamo, Cuba.....	{	Sept. 12, 1916
DUCK, ALLEN DOUGLAS. City Engr., Greenville, Tex.....	{	Sept. 12, 1916
DURANT, WILLIAM BULLARD. 9 Lowell St., Cambridge, Mass.....	{ Jun. Assoc. M.	Jan. 6, 1915 Sept. 12, 1916
ENGER, ARTHUR LUDWIG. Asst. Engr., Agricultural Experiment Station, Tucson, Ariz.....	{ Jun. Assoc. M.	Jan. 2, 1912 Sept. 12, 1916
FIXEN, VICTOR LEROY. Testing Engr., C. A. P. Turner, 2035 Lincoln Ave., St. Paul, Minn.....	{	Sept. 12, 1916
GALLOGLY, ALEXANDER VINCENT. Asst. Engr., Board of Water Supply, 2675 Decatur Ave., New York City.....	{	Sept. 12, 1916
GELSTON, WILLIAM RICHARD. Supt., Citizens Water Works Co. Plant, 314 Maine St., Quincy, Ill.....	{	Sept. 12, 1916
GILMAN, EDGAR DOW. Instr., Experimental Hydr. Eng., Univ. of Minnesota, Minneapolis, Minn.....	{ Jun. Assoc. M.	April 1, 1914 Sept. 12, 1916
GODFREY, STUART CHAPIN. Asst. Prof. of Math., U. S. Military Academy, West Point, N. Y.....	{ Jun. Assoc. M.	Sept. 5, 1911 Sept. 12, 1916
GREENLY, FRANK STICKNEY. U. S. Engr. Office, Burke Bldg., Seattle, Wash.....	{	April 18, 1916
GROVER, WILLIAM ALBERT. City Civ. Engr.; Div. Engr., State Highway Dept., 41 Atkinson St., Dover, N. H.....	{	Sept. 12, 1916
GUERDRUM, GEORGE HAGBART. Care, U. S. Geological Survey, Wanakena, N. Y.....	{	May 31, 1916
HAMILTON, PETER DAVIDSON GUNN. With Stone & Webster Eng. Corporation, 148 Dedham Ave., Needham, Mass.....	{ Jun. Assoc. M.	Feb. 4, 1913 Sept. 12, 1916
HANINK, HERMAN HENRY. Structural Engr., State of Illinois; Chf. Engr., Green & Sons Co., Palos Park, Ill.....	{	Sept. 12, 1916
HART, LAURANCE HASTINGS. Asst. Engr., Luper & Remick, 594 Ellicott Sq., Buffalo, N. Y.....	{ Jun. Assoc. M.	Oct. 3, 1911 June 23, 1916

	ASSOCIATE MEMBERS (<i>Continued</i>)	Date of Membership.
HAYDEN, FRANK DEMETRIUS.	Asst. Engr. and Chf. Clerk, Office of Purchasing Agt., Alaskan Eng. Comm., 5400 First Ave., N. E., Seattle, Wash.	May 31, 1916
HERBOLD, CARL JAMES.	Engr., Walker & Weeks, 102 Savannah Ave., Cleveland, Ohio.	Sept. 12, 1916
HOWARD, JOHN SPENCE.	Chf. Engr., The Thomas Hampton Co.; Cons. Engr., 12 East Lexington St., Balti- more, Md.	Sept. 12, 1916
HYMAN, ARTHUR DAVID.	Waterproofing Engr. and Contr. (The Waterproofing & Constr. Co.), 50 East 42d St., New York City.	Sept. 12, 1916
KELLEY, EARL FOSTER.	Asst. Bridge Engr., Iowa Highway Comm., Box 254, Station A, Ames, Iowa.	Sept. 12, 1916
LAU, PERCY MAPES.	P. O. Box 43, Pontiac, Mich.	Sept. 12, 1916
LAWTON, FREDERICK TYLER.	Asst. Engr., Dept. of State Engr. and Surv., 1073 Seventy-fourth St., Brooklyn, N. Y.	June 23, 1916
LECKIE, ALEXANDER ROSS.	Care, City Engr.'s Office, Dallas, Tex.	Sept. 12, 1916
MCCABE, JOHN JOSEPH.	Res. Engr., U. S. Engr. Dept., U. S. Engr. Office, Bond and Turner Sts., Troy, N. Y.	Sept. 12, 1916
MCCLAIN, CARL ARTHUR.	519 East State St., Ithaca, N. Y.	Sept. 12, 1916
MAEKER, ERWIN.	Care, Fargo Eng. Co., 226 West Main St., Jackson, Mich.	Sept. 12, 1916
MARKS, EDWIN HALL.	Capt., Corps of Engrs., } Jun. U. S. A., West Point, N. Y. } Assoc. M.	Sept. 3, 1913 Sept. 12, 1916
MICHAEL, WILLIAM WHIPPLE.	44 Maiden Lane, King- ston, N. Y.	Sept. 12, 1916
MORRISON, WILLIAM GROVER.	Contr. (Mor- rison Constr. Co.), 311 Hubbell Bldg., } Jun. April 2, 1912 Des Moines, Iowa. } Assoc. M. Sept. 12, 1916	
NORTON, ALBERT COLWELL.	Pres., The Norton Eng. & Contr. Co., 2046 Vine St., Denver, Colo.	Sept. 12, 1916
PHILIPS, HECTOR SOMERVILLE.	Asst. Engr., International Joint Comm., 695 Spadina Ave., Toronto, Ont., Canada.	May 31, 1916
RESWICK, SOLOMON.	Asst. Engr., New York State Barge Canal, 721 North Jay St., Rome, N. Y.	Sept. 12, 1916
SAYER, FRED DENNISTON.	Borough Engr. and Supt., Municipal Water Dept., Brookville, Pa.	Sept. 12, 1916
SCHEDLER, CARL WILLIAM, JR.	Supt., Great } Jun. May 2, 1911 Western Electro-Chemical Co., Box 582, } Assoc. M. Sept. 12, 1916 Pittsburg, Cal.	
SCHMIDT, JOHN GEORGE.	Chf. Engr., Dept. of Public Service, City Hall, Norwood, Ohio.	Sept. 12, 1916

ASSOCIATE MEMBERS (*Continued*)

		Date of Membership.
SELTZER, HYMEN AARON.	Eng. Dept., Christopher & Simpson Iron Works Co., 8th and Park Ave. (Res., 5133 Cates Ave.), St. Louis, Mo.	Jun. May 2, 1911 Assoc. M. Sept. 12, 1916
SHERMAN, JOHN ROCKWOOD.	Asst. Engr., U. S. Reclamation Service, Meadow Creek, Wash.	Sept. 12, 1916
SLEEPER, BENJAMIN ALVAN.	(Haines & Sherman), 306 Temple Bldg., Camden, N. J.	Sept. 12, 1916
STIVERS, ARTHUR DUCAT.	Cons. Engr., Pittsburg, Tex.	Sept. 12, 1916
STREHAN, GEORGE ERNEST.	Asst. Engr., Bureau of Bldgs., Borough of Manhattan (Res., 287 East 203d St.), New York City	Jun. Oct. 3, 1911 Assoc. M. Sept. 12, 1916
STRONG, SIDNEY DAVIS.	Junior Engr., U. S. Engr. Office, Sault Ste. Marie, Mich.	Jun. Nov. 5, 1907 Assoc. M. Mar. 14, 1916
THOMA, JOSEPH C.	U. S. Surv. of Gen. Land Office, 267 East 4th South St., Salt Lake City, Utah	Sept. 12, 1916
TORKELSON, MARTIN WILHELM.	Bridge Engr., Wisconsin Highway Comm., 2141 West Lawn Ave., Madison, Wis.	Sept. 12, 1916
TRAYLOR, KELLS EMMETT.	Track Superv., Columbus Div., So. Ry., Winona, Miss.	Sept. 12, 1916
VANDEMOER, JOHN JAY.	1027 Rood Ave., Grand Junction, Colo.	June 23, 1916
WHITE, WILFRED ASHENHURST.	Civ. and Hydr. Engr. (Rands & White), 921 Electric Bldg., Portland, Ore.	Sept. 12, 1916
WILLIAMS, FREDERICK.	U. S. Surv. and Draftsman, U. S. Engr. Office, New London, Conn.	Jun. Oct. 29, 1912 Assoc. M. Sept. 12, 1916
WILSON, WILLIAM WEST.	Care, D. W. Lum, Special Engr., So. Ry., Washington, D. C.	Jun. Dec. 4, 1906 Assoc. M. April 18, 1916
WOLFF, ALFRED DANIEL, JR.	Res. Engr., N. Y. C. R. R., 24 Forbus St., Poughkeepsie, N. Y.	Jun. Feb. 28, 1911 Assoc. M. Sept. 12, 1916
WRIGHT, RENE BARBER.	Asst. Engr., Bureau of Highways and Bridges, 620 Miller Ave., Portland, Ore.	Jun. Aug. 31, 1909 Assoc. M. April 18, 1916
ASSOCIATES		
BEMIS, ALBERT FARWELL.	Pres., Bemis Bro. Bag Co., Drawer 5173, Boston, Mass.	Sept. 12, 1916
FENNO, EDWARD KIMBALL.	Engr. and Contr., 204 North Beech St., Syracuse, N. Y.	Sept. 12, 1916
MANWARING, ROY ARTIMUS.	(Manwaring & Cummins), 4918 Pulaski Ave., Philadelphia, Pa.	Sept. 12, 1916

666 MEMBERSHIP—ADDITIONS—CHANGES OF ADDRESS [Society Affairs.

ASSOCIATES (Continued)

	Date of Membership.
STANCLIFFE, WILLIAM LEWIS. Gen. Supt., Hassam Publishing Co., P. O. Box 142, Reading, Pa.....	Sept. 12, 1916
	JUNIORS
BETTS, CLIFFORD AULL. Care, Cuban Portland Cement Co., Mariel, Cuba.....	Sept. 12, 1916
BRAGG, KENDAL BENJAMIN. 705 Summers St., Dayton, Ohio.....	Sept. 12, 1916
CHEATHAM, JAMES LESLIE. (Mutart & Cheatham), 615 West 162d St., New York City.....	Sept. 12, 1916
COBB, WILLIAM RICHARD. 1373 Fourth Ave., San Francisco, Cal.....	Mar. 14, 1916
HARDAWAY, BENJAMIN HURT, JR. Engr., Hardaway Contr. Co., Bridgewater, N. C.....	Sept. 12, 1916
HARRINGTON, WALTON. Care, The Technology Club, 17 Gramercy Park, New York City.....	Sept. 12, 1916
HOWARD GERALD BRANCH. Cons. Engr., Nashville, Tenn....	Sept. 12, 1916
IRWIN, WILLIAM CLARK. Dist. Representative, Kalamazoo Ry. Supply Co., 304 Frisco Bldg., St. Louis, Mo....	Sept. 12, 1916
KNISKERN, PHILIP WHEELER. (Knap & Kniskern Co.), 19 South La Salle St., Chicago, Ill.....	Sept. 12, 1916
KORA, DAHYABHAI BALABHAL. Asst. Engr., Gondal State, Gondal (Kathiawar), Bombay Presidency, India.....	May 31, 1916
LEHRBACH, HENRY GARDNER. Asst. Engr., Inspection Dept., Dunn Wire Cut Lug Brick Co., Conneaut, Ohio.....	Mar. 14, 1916
MARIAN, RALPH RICHARDSON. Co. L, 7th New York Infantry, McAllen, Tex.....	April 18, 1916
MATTHEW, RAYMOND. Prof. of Irrig. Eng., New Mexico Coll. of Agriculture and Mechanic Arts, P. O. Box 31, State College, N. Mex.....	May 31, 1916
SPOONER, RAY NEWHALL. Superintending Engr., Allen N. Spooener & Son, Inc.; Res., 259 Parkside Ave., Brooklyn, N. Y.....	Sept. 12, 1916
TILTON, GEORGE ALBERT, JR. Eng. Draftsman, City Engr.'s Office, 1162 North Alexandria Ave., Los Angeles, Cal.....	Sept. 12, 1916
WEED, LLOYD WOOLSEY. Designing Engr., Turner Constr. Co., 307 West 70th St., New York City.....	Sept. 12, 1916
WOOLWORTH, WENDELL HOWARD. Co. D, 7th New York Infantry, McAllen, Tex.....	Sept. 12, 1916

CHANGES OF ADDRESS

MEMBERS

ANTHONY, CHARLES CHAPMAN. Asst. Signal Engr., P. R. R., San José, Cal.	
BALDWIN, ERNEST HOWARD. Senior Engr., U. S. Reclamation Service, El Paso, Tex.	

MEMBERS (*Continued*)

- BARNARD, WILFRED KEEFER. Cons. Engr. (Leeds & Barnard), 1105 Central Bldg., Los Angeles, Cal.
- BEARDSLEY, JAMES WALLACE. 31 Washington St., East Orange, N. J.
- BELDEN, HARRY AUSTIN. Care, Engineers' Club, New York City.
- BUEHLER, WALTER. Cons. Engr., Wood Preservation, 5756 Kenmore Ave., Chicago, Ill.
- BURWELL, ROBERT LEMMON. Asst. Div. Engr., Baltimore Sewerage Comm., Am. Bldg., Baltimore (Res., 8 State Circle, Annapolis), Md.
- CAMPION, HORACE THOMAS. Cons. Engr. (Paine, McClellan & Campion), 1420 Chestnut St., Philadelphia, Pa.
- CARPENTER, CHARLES LINCOLN. Mgr., Central Aguirre Co., Central Aguirre, Porto Rico.
- CLARK, ERNEST ALDEN. Chf. Engr., Eng. Constr. Co., 501 Marshall St., Room 23, Milwaukee, Wis.
- CODE, WILLIAM HENRY. Cons. Engr. (Quinton, Code & Hill), 1112 Hollingsworth Bldg. (Res., 7231 Hillside Ave.), Los Angeles, Cal.
- CONNET, OLIVER WESTON. Civ. and Municipal Engr.; Valuation Engr., West. Md. Ry., 708 Continental Bldg., Baltimore, Md.
- COOMBS, STEPHEN ELBRIDGE. Special Engr., N. Y. C. R. R., Room 2619, Grand Central Terminal, New York City.
- CRUISE, EDGAR DUDLEY. 906 Benton Boulevard, Kansas City, Mo.
- DABNEY, AUGUSTINE LEE. Cons. Hydr. Engr., 376 Randolph Bldg., Memphis, Tenn.
- DARLING, WILLIAM LAFAYETTE. Chf. Engr., N. P. Ry., 722 Merchants National Bank Bldg., St. Paul, Minn.
- DARNELL, JAMES LEE. Cons. Engr., Room 204, Citizens Savings Trust Bldg., Kansas City, Mo.
- DAVIS, CHARLES STRATTON. Senior Structural Engr., Div. of Valuation, Interstate Commerce Comm., 802 Penobscot Bldg., Detroit, Mich.
- DOOLITTLE, HAROLD JAMES. Asst. Engr., State Highway Dept., 437 West 15th Ave., Spokane, Wash.
- DREW, CHARLES DAVIS. Res. Engr., East River Tunnels, Public Service Comm., 159 Remsen St., Brooklyn, N. Y.
- EARLY, PERCY WALKER. Asst. Gen. Mgr., Robert Grace Contr. Co., 442 South Court St., Crown Point, Ind.
- GEHLER, GUSTAV WILLY. Prof., Technische Hochschule, Dresden, Germany.
- HARRIS, VAN ALEN. 43 West Walnut Lane, Germantown, Philadelphia, Pa.
- HENDERSON, HENRI HERBERT. 311 East Main St., Stockton, Cal.
- HORROCKS, JOHN IRVIN. (B. H. M. Lumber Co.), Darrington, Wash.
- HORTENSTINE, HENRY ROBERTS. Sales Mgr. and Chf. Engr., Independent Bridge Co. (Res., 52 South Harrison Ave., Bellevue), Pittsburgh, Pa.
- HOTCHKISS, LOUIS JENISON. 1215 Manadnock Bldg. (Res., 4617 Beacon St.), Chicago, Ill.
- JOHANNESSON, SIGVALD. Asst. Engr., I. R. T. Co., Hotel Van Rensselaer, 17 East 11th St., New York City.

MEMBERS (*Continued*)

- KERSTING, FELIX JOHN. With Kansas City Bridge Co. (Res., 2938 East 28th St.), Kansas City, Mo.
- LEEDS, CHARLES TILESTON. Capt., Corps of Engrs. U. S. A. (*Retired*); Cons. Engr., 1105 Central Bldg., Los Angeles, Cal.
- MACREDIE, JOHN ROBERT CLARKE. Empress, Alberta, Canada.
- MCGREW, ANSON BURLINGAME. U. S. Asst. Engr., U. S. Engr. Office, Lock No. 4, Pa.
- MATHER, THOMAS HOGGAN. Mfrs.' Agt., 419 First National Bank Bldg. (Res., 211 Comstock Ave.), Syracuse, N. Y.
- MATHEWSON, THOMAS KNIGHT. Guasave, Sinaloa, *via* Bamoia, Mexico.
- MORRIS, MARSHALL, JR. Care, Walsh & Burney, Box 1140, Austin, Tex.
- MORRISON, HARRY JOHNSON. Box 197, Beckley, W. Va.
- MUSHAM, JOHN WILLIAM. Estimating Engr., Condron Co., 47 Washington Boulevard, Oak Park, Ill.
- NORTH, ARTHUR TAPPEN. Contr. Engr., 2637 Twenty-seventh Ave., S., Minneapolis, Minn.
- PARKER, FREDERICK YANCY. U. S. Engr. Office, Glasgow, Mo.
- PARKER, PHILIP A MORLEY. Cons. Hydr. Engr., Care, Norton Griffiths, Rawson Chambers, Pitt and Eddy Sts., Sydney, New South Wales, Australia.
- RAYMOND, ALFRED. Gen. Mgr., Drainage Dept., Sewerage and Water Board of New Orleans, 503 City Hall Annex (Res., 1111 Fern St.), New Orleans, La.
- RAYNOR, CLARENCE WEBSTER. Contr. Engr., 142½ Second St., Portland, Ore.
- RICKER, GEORGE ALFRED. Advisory Engr., Portland Cement Assoc., Commerce Bldg., Kansas City, Mo.
- SEABURY, GEORGE TILLEY. Div. Engr., Providence Water Supply Board, South Scituate (Res., North Scituate), R. I.
- SKINNER, FRANK WOODWARD. Cons. Engr., 233 Broadway, New York City.
- SNOW, JESSE BAKER. Res. Engr., Public Service Comm., First Dist.; Res., 166 Portsmouth Pl., Forest Hills, N. Y.
- TAYLOR, JOHN. Engr. and Contr., 37 Sun Life Bldg., Hamilton, Ont., Canada.
- THOMAS, JOHN CHARLES. Vice-Pres., National Contract Co., Hotel Leighton, Los Angeles, Cal.
- WALDRON, ALBERT EDWIN. Maj., Corps of Engrs., U. S. A., U. S. Engr. Office, Post Office Bldg., Wilmington, N. C.
- WILLIAMS, CHAUNCEY GRANT. 140 East 9th St., Plainfield, N. J.
- ZINN, AARON STANTON. 5023 Champlain Ave., Chicago, Ill.

ASSOCIATE MEMBERS

- ASHBROOK, CHESTER DANIEL. Care, The Braden Copper Co., Rancagua (Sewell), Chile.
- ASHLEY, CARL. Care, East Jersey Pipe Corporation, Paterson, N. J.
- BALDWIN, THOMAS ABBOTT. Care, Bethlehem Steel Bridge Corporation, Steelton, Pa.

ASSOCIATE MEMBERS (*Continued*)

- BARNARD, ARCHER FORTESCUE. Asst. Engr., Leeds & Barnard, 1105 Central Bldg., Los Angeles, Cal.
- BEALL, PENDLETON. Engr., The Texas Co., 223 West 78th St., New York City.
- BIGGS, CARROLL ADDISON. 362½ Whitney Ave., Detroit, Mich.
- BLIEM, DANIEL WILLIAM. Gen. Sales Dept., Midvale Steel & Ordnance Co., Widener Bldg., Philadelphia, Pa.
- BOGESS, LOUIS STERLING. Care, Bureau of Public Works, Manila, Philippine Islands.
- BROWN, ELBERT CALVIN. Care, Bureau of Public Works, Manila, Philippine Islands.
- BRYAN, EVERETT N. Chf. Engr., Waterford Irrig. Dist., Waterford, Cal.
- BURDETT, OWEN LONG. Asst. Engr., Dept. of State Engr. and Surv., 394 Potomac Ave., Buffalo, N. Y.
- CALDWELL, JOHN WORDE. Vice-Pres., Child & Caldwell, Ltd., Blaisdell Blk., Honolulu, Hawaii.
- CHURCH, HARTLEY ROBERT. 731 Wells Fargo Bldg., San Francisco, Cal.
- COHEN, CHARLES. Cons. Engr. (Chas. Cohen & Leo J. Ehrhart, Inc.), 1932 Arthur Ave., New York City.
- COMBER, STAFFORD XAVIER. Sea Defence Office, Georgetown, British Guiana.
- CORLETT, WILLIAM GREENFIELD. Archt. and Engr., Oakland Bank of Savings Bldg., Oakland, Cal.
- CORRIGAN, GEORGE WASHINGTON. Div. Engr., S. P. Co., 409 Stockton Savings & Loan Bldg., Stockton, Cal.
- CULLEN, ROBERT EMMET. With E. I. du Pont de Nemours & Co., 1010 Madison St., Wilmington, Del.
- DANN, ALEXANDER WILLIAM. Treas. and Asst. Supt., Dravo Contr. Co., The Washington, Portsmouth, Ohio.
- DAVIS, MEYER. Chf. Engr., Asbestos Protected Metal Co., First National Bank Bldg., Pittsburgh, Pa.
- DECKER, ARTHUR JAMES. Associate Prof. of Civ. Eng., Univ. of Michigan, 827 Arch St., Ann Arbor, Mich.
- DODGE, FRANK EARLE. Care, Knickerbocker Portland Cement Co., 30 East 42d St., New York City.
- FRASER, GUY OWEN. 5998 Canning St., Oakland, Cal.
- FROST, EDWARD MURRAY. 380 West Main St., Waterbury, Conn.
- GALBREATH, WILLIAM OTTO. Care, Eng. Dept., C. G. W. R. R., Chicago, Ill.
- GASS, HOWARD RAY. Care, The Public Service Comm., Jefferson City, Mo.
- GAUSMANN, ROY WARNER. Asst. Engr., Board of Water Supply, Shandaken, N. Y.
- GOULD, CHESTER MASON. Asst. Engr., Dept. of Finance, Room 612, Municipal Bldg. (Res., 2512 University Ave.), New York City.
- GREENE, RUSSELL DE COSTA. 327 West 56th St., New York City.

ASSOCIATE MEMBERS (*Continued*)

- HALL, WARD. Res. Engr., Alaskan Eng. Comm., Alamo, Cal.
- HAYWOOD, CHARLES ELLSWORTH. Engr., Westinghouse, Church, Kerr & Co., 37 Wall St., New York City. (Res., 1058 Post Ave., Port Richmond, N. Y.).
- HAZELTON, WILLIAM SYLVESTER. (Hazelton-Clark Co.), 44 McGraw Bldg., Detroit, Mich.
- HENDRIE, JOHN GIBSON. Asst. Mgr., The Barber Asphalt Paving Co., Maurer (Res., Sewaren), N. J.
- HIRAI, KIKUMATSU. Care, Prof. Cary, Carnegie Bldg., Rensselaer Polytechnic Inst., Troy, N. Y.
- JOHNSON, MARO. Asst. Engr., Ill. Cent. R. R., 1434 East 65th St., Chicago, Ill.
- JONES, ROBERT SHARP. Superv. Engr., The Terminals Hotel Co., Marshall Bldg., Cleveland, Ohio.
- KUMPE, KARL BARCLAY. Canadian Mgr. and Chf. Engr., Pacific Lock Joint Pipe Co., 1103 First Ave., Seattle, Wash.
- LANDERS, CHARLES SCOTT. Engr. and Contr. (The Substructure Co., Inc.), 115 Broadway, New York City.
- LEHFELT, WALT FERD. Care, E. C. Barnard, International Boundary Commr., U. S. Coast and Geodetic Survey, Washington, D. C.
- LEWIS, JOHN OVINGTON. Asst. Engr., Bureau of Bldgs., Borough of Manhattan, 556 Sixteenth St., Brooklyn, N. Y.
- LIEB, VICTOR. With Texas State Board of Water Engrs. (Res., 4205 Ave. D), Austin, Tex.
- LUPINSKI, OSWALD. Engr. and Contr. (Lupinski-Richards Co.), 6103 Jenkins Arcade, Pittsburgh (Res., 3 Division St., Crafton), Pa.
- MCCULLOUGH, CONDE BALCOM. 440 North Sixth St., Corvallis, Ore.
- McGRATH, JOHN KILBY. Road Engr., Fayetteville Dist., Mt. Hope, W. Va.
- MCLEOD, DONALD FRASER. Drawer 8, University, Miss.
- MADISON, JAMES TALBOTT. 2196 O'Farrell St., San Francisco, Cal.
- MASON, SAMUEL JEFFERSON. City Surv.; (Mason & Smith), 309 Madison Ave., Perth Amboy, N. J.
- MENESEE, FERDINAND NORTHRUP. Asst. Prof. of Eng. Mech., Univ. of Michigan, 209 North Blackstone St., Jackson, Mich.
- METCALFE, JOSEPH DAVIS. Care, Chf. Engr., G. C. & S. F. Ry., Galveston, Tex.
- MILLER, HIRAM. Junior Engr., U. S. Engr. Office, P. O. Bldg., New London, Conn.
- MOORE, CHARLES REA. Engr. in Chg., General Constr. Co., Lewiston, Idaho.
- PAYROW, HARRY GORDON. 427 Cherokee St., South Bethlehem, Pa.
- PORZELIUS, ALBERT FREDRICK. Acting Supt., Louisiana Water Co., Louisiana, Mo.
- ROBERTSON, STANLEY HORTON. Asst. Gen. Mgr., Acme Mfg. Co., Andrews Paper Box Co., and O. B. Andrews Co., 627 Vine St., Chattanooga, Tenn.

ASSOCIATE MEMBERS (*Continued*)

- SANGER, WALTER MAX. 635 Lincoln Ave., Toledo, Ohio.
- SHAFER, JAMES CHARLES FORSYTHE. Care, Structural Concrete Co., Dayton, Ohio.
- SOPER, ELLIS CLARK. Cons. Engr., Mariel, Cuba.
- SOVEREIGN, HARRY EVANS. Box 444, Laredo, Tex.
- STANTON, HARRY SEEL. Care, E. W. Hess, Du Bois, Pa.
- STEVENSON, WILLIAM FREEMAN. 30 Elk Ave., New Rochelle, N. Y.
- TAYLOR, CHESTER ANTRIM. Supt., Herbert L. Bass & Co., 128 Ninth St., Miami, Fla.
- TEETER, EARLE EVERETT. Asst. Engr., U. S. Reclamation Service, Derry, N. Mex.
- TUNSTALL, WHITMELL PUGH. Physics Dept., Lehigh Univ., South Bethlehem, Pa.
- ULBRICH, DANIEL. Palma Sola, Fla.
- UNDERHILL, GEORGE GARDNER. Care, L. G. Mouchel & Partners, Ltd., New Birks Bldg., Montreal, Que., Canada.
- VANDEROOT, BENJAMIN FRANKLIN. 521 Eastern Parkway, Brooklyn, N. Y.
- WEIDNER, CARL ROBERT. Care, The Prairie Pipe Line Co., Independence, Kans.
- WENZELL, ANDREW PERRY. Cons. Engr., 410 Congress Bldg., Detroit, Mich.
- WOODSON, LEROY. 4586 Cote Brilliante Ave., St. Louis, Mo.

ASSOCIATES

- POLK, WILLIAM ANDERSON. The Chemists' Club, New York City.
- ROBBINS, ARTHUR GRAHAM. Prof. of Topographical Eng., Mass. Inst. Tech., Cambridge, Mass.

- WRENN, JAMES FRANCIS. Pres. and Gen. Mgr., McGuire Constr. Co., Suffolk, Va.

JUNIORS

- BICKERTON, WILBUR EARL. 1123 Munsey Bldg., Baltimore, Md.

- COLGAN, ROBERT JOSEPH. Asst. Supt., P. R. R., 332 West 8th St., Erie, Pa.

- COOPER, CLARENCE WINSTON. Contr. Engr., Box 368, Anniston, Ala.

- EDGECOMB, REX EDWARD. Civ. Eng. Dept., Univ. of Pennsylvania, 5834 Angora St., Philadelphia, Pa.

- ELIOT, WILLIAM MACK. 3826 Ave. Q, Galveston, Tex.

- FINDLAY, ELWIN HAROLD. 293 Vine St., Bridgeport, Conn.

- GRAY, EARLE PIERCE. Instrumentman, Office of Res. Engr., N. Y. C. R. R., 615 Walbridge Ave., Toledo, Ohio.

- HEINONEN, HENRY JALMAR. Draftsman, Blaw Steel Constr. Co., 6358 Aurelia St., East Liberty, Pittsburgh, Pa.

- HESLOP, PAUL LOVERIDGE. 26 Watkins Ave., Middletown, N. Y.

- MAY, DONALD CURTIS. 1018 Corn Exchange Bank, Chicago, Ill.

- MICHENER, HOWARD PERRY. 215 Hutchinson Boulevard, Mount Vernon, N. Y.

- MONTGOMERY, ALBERTIS. 3102 West 44th St., Minneapolis, Minn.

JUNIORS (Continued)

- MORSE, FREDERICK THURLOUGH. Care, Div. Engr., Santa Fé Ry., Marceline, Mo.
- OLERI, FRANK JOHN. Ship Draftsman, Civil Service Comm., Brooklyn Navy Yard, 19 Twenty-second St., West New York, N. J.
- PEEK, JESSE HOPE. Eng. Soc. of Pennsylvania, Harrisburg, Pa.
- ROBERTS, HAROLD WHITNEY. 520 West 139th St., New York City.
- SEE, RUSSELL ALVA. Care, U. S. Reclamation Service, Torrington, Wyo.
- SMITH, HERSCHEL C. Engr., Am. Concrete Form Co., 323 Unity Bldg., Bloomington, Ill.
- STARKWEATHER, ALFRED KENNETH. Asst. Engr., Passaic Val. Sewerage Comm., 366 Van Houten Ave., Passaic, N. J.
- STRANDBERG, GEORGE ROBERT. 335 Thorn St., Sewickley, Pa.
- SWIGART, CLYDE ARTHUR. Engr., Standard Oil Co., Pipe Line Dept., Bin No. 15, Bakersfield, Cal.
- THOMPSON, JAMES ARTHUR. Care, Hoyt Metal Co., 300 North Broadway, St. Louis, Mo.
- THORNTON, CHARLES EDWARD. City Water-Works, Room 112, City Hall, Richmond, Va.
- WEBB, CLAUDE ALLEN. Y. M. C. A., 404 East 10th St., Kansas City, Mo.
- WHITNEY, RALPH EDWARD. Res. Engr., Robert Spurr Weston, 191 Powder House Boulevard, West Somerville, Mass.

DEATHS

- BLOSS, RICHARD PARKHURST. Elected Member, January 6th, 1904; died May 22d, 1916.
- BOYNTON, ROBERT HAMMOND. Elected Junior, May 6th, 1914; Associate Member, April 18th, 1916; died September 18th, 1916.
- CALDWELL, CHARLES ADOLPHUS. Elected Member, September 5th, 1911; died August 31st, 1916.
- STANTON, FRANK McMILLAN. Elected Member, February 1st, 1899; died September 11th, 1916.

Total Membership of the Society, October 5th, 1916,

8 116.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST

(September 2d to October 2d, 1916)

NOTE.—*This list is published for the purpose of placing before the members of this Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS

In the subjoined list of articles, references are given by the number prefixed to each journal in this list:

- (2) *Proceedings*, Engrs. Club of Phila., Philadelphia, Pa.
- (3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
- (4) *Journal*, Western Soc. of Engrs., Chicago, Ill., 50c.
- (5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
- (6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
- (7) *Gesundheits Ingenieur*, München, Germany.
- (8) *Stevens Institute Indicator*, Hoboken, N. J., 50c.
- (9) *Engineering Magazine*, New York City, 25c.
- (11) *Engineering* (London), W. H. Wiley, 432 Fourth Ave., New York City, 25c.
- (12) *The Engineer* (London), International News Co., New York City, 35c.
- (13) *Engineering News*, New York City, 15c.
- (14) *Engineering Record*, New York City, 10c.
- (15) *Railway Age Gazette*, New York City, 15c.
- (16) *Engineering and Mining Journal*, New York City, 15c.
- (17) *Electric Railway Journal*, New York City, 10c.
- (18) *Railway Review*, Chicago, Ill., 15c.
- (19) *Scientific American Supplement*, New York City, 10c.
- (20) *Iron Age*, New York City, 20c.
- (21) *Railway Engineer*, London, England, 1s. 2d.
- (22) *Iron and Coal Trades Review*, London, England, 6d.
- (23) *Railway Gazette*, London, England, 6d.
- (24) *American Gas Light Journal*, New York City, 10c.
- (25) *Railway Mechanical Engineer*, New York City, 20c.
- (26) *Electrical Review*, London, England, 4d.
- (27) *Electrical World*, New York City, 10c.
- (28) *Journal*, New England Water-Works Assoc., Boston, Mass., \$1.
- (29) *Journal*, Royal Society of Arts, London, England, 6d.
- (30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium, 4 fr.
- (31) *Annales de l'Assoc. des Ing. Sortis des Ecoles Spéciales de Gand*, Brussels, Belgium, 4 fr.
- (32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
- (33) *Le Génie Civil*, Paris, France, 1 fr.
- (34) *Portefeuille Économiques des Machines*, Paris, France.
- (35) *Nouvelles Annales de la Construction*, Paris, France.
- (36) *Cornell Civil Engineer*, Ithaca, N. Y.
- (37) *Revue de Mécanique*, Paris, France.
- (38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
- (39) *Technisches Gemeindeblatt*, Berlin, Germany, 0, 70m.
- (40) *Zentralblatt der Bauverwaltung*, Berlin, Germany, 60 pf.
- (41) *Electrotechnische Zeitschrift*, Berlin, Germany.
- (42) *Proceedings*, Am. Inst. Elec. Engrs., New York City, \$1.
- (43) *Annales des Ponts et Chaussées*, Paris, France.
- (44) *Journal*, Military Service Institution, Governors Island, New York Harbor, 50c.
- (45) *Coal Age*, New York City, 10c.
- (46) *Scientific American*, New York City, 15c.
- (47) *Mechanical Engineer*, Manchester, England, 3d.
- (48) *Zeitschrift*, Verein Deutscher Ingenieure, Berlin, Germany, 1, 60m.
- (49) *Zeitschrift für Bauwesen*, Berlin, Germany.
- (50) *Stahl und Eisen*, Düsseldorf, Germany.
- (51) *Deutsche Bauzeitung*, Berlin, Germany.
- (52) *Riga'sche Industrie-Zeitung*, Riga, Russia, 25 kop.
- (53) *Zeitschrift*, Oesterreichischer Ingenieur und Architekten Verein, Vienna, Austria, 70h.
- (54) *Transactions*, Am. Soc. C. E., New York City, \$12.
- (55) *Transactions*, Am. Soc. M. E., New York City, \$10.
- (56) *Transactions*, Am. Inst. Min. Engrs., New York City, \$6.

- (57) *Colliery Guardian*, London, England, 5d.
 (58) *Proceedings, Engrs. Soc. W. Pa.*, 2511 Oliver Bldg., Pittsburgh, Pa., 50c.
 (59) *Proceedings, American Water-Works Assoc.*, Troy, N. Y.
 (60) *Municipal Engineering*, Indianapolis, Ind., 25c.
 (61) *Proceedings, Western Railway Club*, 225 Dearborn St., Chicago, Ill., 25c.
 (62) *Steel and Iron*, Thaw Bldg., Pittsburgh, Pa., 10c.
 (63) *Minutes of Proceedings, Inst. C. E.*, London, England.
 (64) *Power*, New York City, 5c.
 (65) *Official Proceedings, New York Railroad Club*, Brooklyn, N. Y., 15c.
 (66) *Journal of Gas Lighting*, London, England, 6d.
 (67) *Cement and Engineering News*, Chicago, Ill., 25c.
 (68) *Mining Journal*, London, England, 6d.
 (69) *Der Eisenbau*, Leipzig, Germany.
 (71) *Journal, Iron and Steel Inst.*, London, England.
 (71a) *Carnegie Scholarship Memoirs*, Iron and Steel Inst., London, England.
 (72) *American Machinist*, New York City, 15c.
 (73) *Electrician*, London, England, 18c.
 (74) *Transactions, Inst. of Min. and Metal*, London, England.
 (75) *Proceedings, Inst. of Mech. Engrs.*, London, England.
 (76) *Brick*, Chicago, Ill., 20c.
 (77) *Journal, Inst. Elec. Engrs.*, London, England, 5s.
 (78) *Beton und Eisen*, Vienna, Austria, 1, 50m.
 (79) *Forscharbeiten*, Vienna, Austria.
 (80) *Tonindustrie Zeitung*, Berlin, Germany.
 (81) *Zeitschrift für Architektur und Ingenieurwesen*, Wiesbaden, Germany.
 (82) *Mining and Engineering World*, Chicago, Ill., 10c.
 (83) *Gas Age*, New York City, 15c.
 (84) *Le Cement*, Paris, France.
 (85) *Proceedings, Am. Ry. Eng. Assoc.*, Chicago, Ill.
 (86) *Engineering-Contracting*, Chicago, Ill., 10c.
 (87) *Railway Maintenance Engineer*, Chicago, Ill., 10c.
- (88) *Bulletin of the International Ry. Congress Assoc.*, Brussels, Belgium.
 (89) *Proceedings, Am. Soc. for Testing Materials*, Philadelphia, Pa., \$5.
 (90) *Transactions, Inst. of Naval Archts.*, London, England.
 (91) *Transactions, Soc. Naval Archts. and Marine Engrs.*, New York City.
 (92) *Bulletin, Soc. d'Encouragement pour l'Industrie Nationale*, Paris, France.
 (93) *Revue de Métallurgie*, Paris, France, 4 fr. 50.
 (95) *International Marine Engineering*, New York City, 20c.
 (96) *Canadian Engineer*, Toronto, Ont., Canada, 10c.
 (98) *Journal, Engrs. Soc. Pa.*, Harrisburg, Pa., 30c.
 (99) *Proceedings, Am. Soc. of Municipal Improvements*, New York City, \$2.
 (100) *Professional Memoirs, Corps of Engrs.*, U. S. A., Washington, D. C., 50c.
 (101) *Metal Worker*, New York City, 10c.
 (102) *Organ für die Fortschritte des Eisenbahnwesens*, Wiesbaden, Germany.
 (103) *Mining Press*, San Francisco, Cal., 10c.
 (104) *The Surveyor and Municipal and County Engineer*, London, England, 6d.
 (105) *Metallurgical and Chemical Engineering*, New York City, 25c.
 (106) *Transactions, Inst. of Min. Engrs.*, London, England, 6s.
 (107) *Schweizerische Bauzeitung*, Zürich, Switzerland.
 (108) *Iron Tradesman*, Atlanta, Ga., 10c.
 (109) *Journal, Boston Soc. C. E.*, Boston, Mass., 50c.
 (110) *Journal, Am. Concrete Inst.*, Philadelphia, Pa., 50c.
 (111) *Journal of Electricity, Power and Gas*, San Francisco, Cal., 25c.
 (112) *Internationale Zeitschrift für Wasser-Versorgung*, Leipzig, Germany.
 (113) *Proceedings, Am. Wood Preservers' Assoc.*, Baltimore, Md.
 (114) *Journal, Institution of Municipal and County Engineers*, London, England, 1s. 6d.
 (115) *Journal, Engrs. Club of St. Louis*, St. Louis, Mo., 35c.
 (116) *Blast Furnace and Steel Plant*, Pittsburgh, Pa., 15c.

LIST OF ARTICLES

Bridges.

- Standard Plans for I-Beam and Concrete Bridges.* (13) Sept. 7.
 Foundation Work on the Metropolis Bridge.* (15) Sept. 8.
 Reinforced-Concrete Arch has Masonry Facing.* (14) Sept. 9.
 Erection of Quebec Bridge Suspended Span.* A. J. Meyers. (13) Sept. 14.
 Wind Damages Highway Bridge.* (14) Sept. 16.
 Little Plant Required to Complete 4 000-Ft. Concrete Railroad Bridge.* (14) Sept. 16.
 The Full Evidence on the Fall of the Quebec Bridge Span.* (13) Sept. 21.
 Shallow Railway Floor on Canal Bascule Bridge.* Arthur G. Hayden. (13) Sept. 21.

* Illustrated.

Bridges—(Continued).

- The Cause of the Quebec Bridge Disaster.* (15) Sept. 22; (18) Sept. 23; (96) Sept. 21; (13) Sept. 14.
 Revolutionary Methods Used to Float and Hoist Center Span of Quebec Bridge.* (14) Sept. 23.
 Breakage of Casting of Rocker-Joint Bearing Responsible for Quebec Bridge Disaster.* (14) Sept. 23; (20) Sept. 21.
 Hopple Street Viaduct, Cincinnati, is Built with Cantilever Beams of Arch Form.* Edgar K. Ruth. (14) Sept. 23.
 Reinforced-Concrete Pipe Used for Railway Culverts.* (13) Sept. 28.
 Test of New Type Reinforced-Concrete Bridge.* (13) Sept. 28.
 Central Bridge at Lawrence is Built from Four Separate Mixing Plants.* E. K. Cortright. (14) Sept. 30.
 Les Ponts Militaires pour l'Establishement de Passages Provisoires Ponts Métallique Démontables.* A. Bidault des Chaumes. (33) Aug. 19.
 Nouveau Pont en Béton Armé sur le Mississippi à Minneapolis (Minnesota, Etats-Unis).* (33) Sept. 9.

Electrical.

- Approximate Solution of Short-Circuit Problems.* E. G. Merrick. (73) Aug. 25.
 An Approximate Method of Calculating Short-Circuit Current in an Alternating-Current System.* H. R. Wilson. (73) Aug. 25.
 Prevention of Condenser Corrosion (Electrolytic method). J. F. Peter. (Paper read before the Inst. of Marine Engrs.) (26) Aug. 25.
 Paisley Automatic Telephone Exchange.* J. Hedley. (73) Aug. 25.
 The Determination of the Constant of a Solenoid.* S. R. Williams. (3) Sept.
 Originality in Street Lighting Standards.* Albert Marple. (60) Sept.
 Inductive Interference as a Practical Problem.* A. H. Griswold and R. W. Mastick. (42) Sept.
 The Characteristics of Tungsten Filaments as Functions of Temperature. Irving Langmuir. (73) Sept. 1.
 The Active Materials and Electrolyte of the Alkaline Storage Battery. L. C. Turnock. (108) Sept. 1.
 The Sperry Searchlight. (11) Sept. 1; (26) Sept. 8.
 Switchboards for Polyphase Testing.* A. T. Bullen. (26) Sept. 1.
 Downtown Lighting System for San Francisco.* Walter D'Arcy Ryan. (27) Sept. 2.
 Impedances of Iron and Steel Wire. Clem A. Copeland. (111) Sept. 2.
 Lighting That Combines Art and Science.* Louis Bell. (27) Sept. 2.
 Street Lighting System of Sheboygan, Wis.* Carroll H. Shaw. (27) Sept. 2.
 Electrical Machine Bearings.* Gordon Fox. (64) Sept. 5.
 Twin-City Power Plants.* Thomas Wilson. (64) Sept. 5.
 The Influence of Pressure on the Electrical Ignition of Methane.* W. M. Thornton. (Paper read before Section G of the British Assoc.) (73) Sept. 8.
 1,500 K.W. Geared Turbo-Generator at the Westinghouse Works, Trafford Park, Manchester.* (11) Serial beginning Sept. 8.
 The Calculation of the Capacity of Radio-Telegraph Antennæ, Including the Effects of Masts and Buildings.* G. W. O. Howe. (Abstract of paper read before Section G of the British Assoc.) (73) Sept. 8.
 Electric Signalling With Bare Wires. Sydney F. Walker. (22) Sept. 8.
 Eliminating Transmission Line Telephone Troubles.* E. P. Peck. (27) Sept. 9.
 Operation of a Small Diesel Engine Plant.* (27) Sept. 9.
 The Fuller Electrical Manufacturing Works. Chadwell Heath.* (26) Sept. 15.
 Operation of a Non-Synchronous Rotating Gap.* A. S. Blatterman. (27) Sept. 16.
 Making Cable Joints with Formed Insulation.* (27) Sept. 16.
 Service Connections from Underground Mains.* E. B. Meyer. (27) Sept. 16.
 Electrification of a Modern Cement Company.* D. C. Findlay. (111) Serial beginning Sept. 16.
 Distribution-Loss Factors. Terrell Croft. (64) Sept. 19.
 Accounting at Pasadena Plant.* L. R. W. Allison. (64) Sept. 19.
 Extension to West Penn Co.'s Connellsburg Power Plant.* Warren O. Rogers. (64) Sept. 19.
 Providing Adequate Street Illumination for Unusual Local Conditions.* (27) Sept. 23.
 High-Intensity Searchlight for Governmental Purposes.* (27) Sept. 23.
 Practical Talks on Controllers-Reversing Switches.* A. A. Fredericks. (64) Sept. 26.
 Operating Results of Cleveland Municipal Lighting Plant. (13) Sept. 28.
 Les Sous-Station de Transformation en Plein Air.* J. Vichniak. (33) Aug. 19.
 Um-und Neubau der Schalt-und Transformatoren-Anlage des Elektrizitätswerkes Beznau an der Aare.* (107) Serial beginning Aug. 12.
 Die Berücksichtigung des Wicklungssinnes in der theoretischen Elektrotechnik.* Otto Block. (107) Sept. 9.

152112010

Marine.

- The Sperry Active Gyroscope for Stabilising Ships.* (12) Aug. 25.
 The Ljungström Turbine and Its Application to Marine Propulsion. Ronald S. Portham. (47) Sept. 1.
 Machine Shops on the United States Repair Ship *Prometheus*.* Frank A. Stanley. (72) Sept. 7.
 Light Cruisers in the War. (12) Sept. 8.
 Craig Marine Diesel.* (64) Sept. 26.
 Floating Foundry and Forge Shop.* (72) Sept. 28.
 Le Ceara, Navire-Dépot pour les Sous-Marins de la Marine brésilienne.* Ch. Dantin. (33) Aug. 19.

Mechanical.

- Power with By-Product Recovery.* T. Roland Wollaston. (12) Aug. 25.
 Boilers Heated by Coke-Oven Gas.* (22) Serial beginning Aug. 25.
 On the Determination of the Leakages in Gas-Pipes.* Michelangelo Boehm. (66) Aug. 29.
 Electric Welding in Boiler Shop Repairs. P. E. Gallagher. (Paper read before Master Boiler Makers' Assoc.) (62) Sept.
 Production of Dies and Marking Devices.* Charles C. Lynde. (62) Sept.
 Straight Line Forge Shop Plant Lay-out.* C. S. Kinnison. (62) Sept.
 Operating Costs in Combined Power and Heating Plants.* Charles L. Hubbard. (9) Sept.
 Power Equipment for Steam Plants.* Robert L. Streeter. (9) Serial beginning Sept.
 A Novel Method of Ditching a Cut.* H. M. Church. (87) Sept.
 New Plant of the Texas Portland Cement Company at Houston.* (67) Sept.
 The Gas Works of Philadelphia. P. T. Dashiell. (2) Sept.
 Military Aviation.* (44) Sept.
 The Use of Powdered Coal in Metallurgical Processes: a Discussion of the Engineering Principles Involved.* C. J. Gadd. (3) Sept.
 Cutting Metals with the Oxy-Acetylene Flame.* Henry Cave. (9) Sept.-Oct.
 Pressing and Stamping Metals. Oberlin Smith. (9) Sept.-Oct.
 Rubber Vulcanization Accelerators. Andrew H. King. (105) Sept. 1.
 The Manufacture and Use of High-Speed Steel. Henry D. Hibbard. (22) Sept. 1.
 Peat v. Coal for Production of Power.* B. F. Haanel. (57) Sept. 1.
 B. T. H. Turbo Air Compressors.* (26) Sept. 1.
 Though Present Commercially Available Lighting Fixtures Meet Possibly Ninety Per Cent. of Conditions Presented, There is Still an Important Field for Fixtures of Unusual Size.* Robert French Pierce. (24) Sept. 4.
 Fractional Valves.* James A. Donnelly. (Abstract of paper read before Am. Soc. of Heating and Ventilating Engrs.) (64) Sept. 5.
 Factors that Influence the Selection of a Condenser.* H. J. Macintire. (64) Sept. 5.
 The Application of Scientific Management to Burning Clay.* Dwight T. Farnham. (76) Sept. 5.
 Jobbing Foundry Installs 2-Ton Furnace.* (20) Sept. 7.
 Production Methods in Gas Engine Plant.* O. J. Abell. (20) Sept. 7.
 Cutting Speeds and Feeds.* W. A. Knight. (72) Sept. 7.
 Plant for Making Electric Vacuum Cleaners.* (20) Sept. 7.
 Two Examples of Foundry Cost Accounting.* W. E. Freeland. (20) Sept. 7.
 Engineering Service Plus Machine Building.* O. J. Abell. (20) Sept. 7.
 A Centrifugal Machine for Casting Pipe.* (20) Sept. 7; (101) Sept. 15.
 Limit Gauges.* R. T. Glazebrook. (Paper read before the British Assoc.) (12) Serial beginning Sept. 8; (11) Sept. 8.
 Oil Engines and Steam Engines in Combustion.* Geoffrey Porter. (Abstract of paper read before the Diesel Engine Users' Assoc.) (26) Sept. 8.
 An Analysis of the Motor-Truck Question. (45) Sept. 9.
 The Matter of Slack Belts.* W. F. Schaphorst. (16) Sept. 9.
 Operation of Boilers with Balanced Draft.* R. I. Elkin. (27) Sept. 9.
 Difficulty of Obtaining Samples at Reasonable Cost Has Been Serious Drawback to General Adoption of Specification Method for the Purchase of Coal.* (24) Sept. 11.
 Inter-Boiler Inspection. J. C. Hawkins. (64) Sept. 12.
 Manufacturing Sharpening Stones.* (72) Sept. 14.
 The Processes of the Organic Chemical Industry Used in the Manufacture of Intermediate Products.* A. H. Ney and D. J. Van Marle. (105) Sept. 15.
 Interesting Canadian Wrinkles on Distribution. P. S. Lamb. (Paper read before the Canadian Gas Assoc.) (83) Sept. 15.
 Aluminium Castings and forgings. P. E. McKinney. (105) Sept. 15.
 A Heat-Treating Plant Using Surface Combustion. (105) Sept. 15.
 Giant Revolving Shovel Used at Gravel Plant. (14) Sept. 16.
 Construction of Furnaces of the Surface Combustion Type are Rapidly Changing and Obtaining a Wider Adoption Ranging from Domestic Gas Stove to Carbonization of Coal. Nisbet Latta. (24) Sept. 18.

* Illustrated.

Mechanical—(Continued).

- Disastrous Boiler Explosion at Jackson, Tenn.* J. A. Willard. (64) Sept. 19.
 York Poppet-Valve Return-Flow and Uniflow Engines.* (64) Sept. 19.
 Testing Refrigerating Plants. Julian Smallwood. (64) Sept. 19.
 Critical Speeds of Shafts.* William Knight. (72) Sept. 21.
 Electric Refrigerator for Indoor Ice Rink.* (27) Sept. 23.
 Navy Test of Lubricating Oil. J. L. Kauffman. (From *Journal of the Am. Soc. of Naval Engrs.*) (64) Sept. 26.
 Old-Time Tools and Mechanics in a New England Shop.* Frank A. Stanley. (72) Serial beginning Sept. 28.
 Manufacture and Properties of Semi-Steel.* David M'Lain. (From paper read before the Am. Foundrymen's Convention.) (20) Sept. 28.
*Les Palmers de Précision, Étude sur la Variabilité de leur Rayon d'Action.** (33) Sept. 16.

Metallurgical.

- The Atmospheric Oxidation of Iron Pyrites. T. F. Winmill. (106) Vol. 51, Pt. 4.
 Ore Concentration by Flotation. (11) Aug. 25.
 Commercial Considerations Concerning the Blast Furnace. J. E. Johnson, Jr. (105) Sept. 1.
 Tungsten in the Boulder District, Colorado.* E. H. Leslie. (103) Sept. 2.
 Jig Concentration in Joplin District, Missouri. Clarence A. Wright. (103) Sept. 2.
 Concentration at Inspiration.* (16) Serial beginning Sept. 2.
 Molecular Forces and Flotation. Will H. Coghill. (103) Sept. 2.
 The Grönwall-Dixon Electric Furnace for Production of Steel Billets.* (20) Sept. 7.
 Zinc Smelting in Vertical Retorts.* (103) Sept. 9.
 Notes on the Chemical Assay of Tin Ores. A. M. Matheson. (Paper read before the Australasian Inst. of Min. Engrs.) (82) Sept. 9.
 Construction and Operation of the Nevada Packard Mill.* Herbert G. Thomson. (103) Sept. 9.
 Concentration and Smelting of Vanadium Ore.* R. L. Grider. (103) Sept. 9.
 Electric Alloy Steels Made on Tonnage Basis.* (20) Sept. 14.
 Converter Steel Castings Low in Manganese.* Edwin F. Cone. (20) Sept. 14.
 The Metal Tie-Up in Electrolytic Refining.* Lawrence Addicks. (105) Sept. 15.
 Recent Developments in Zinc Concentration Practice in the Joplin District, Missouri. H. C. Parmelee. (105) Sept. 15.
 The Selection of a Method of Ore-Treatment. George J. Young. (105) Sept. 15.
 Blast Furnace Products. J. E. Johnson, Jr. (105) Sept. 15.
 Flotation Tribulations.* Jackson A. Pearce. (103) Sept. 16.
 Atmospheric Decomposition of Cyanide Solutions. G. H. Clevenger and Harry Morgan. (103) Sept. 16.
 Surface Tension Oil-Water Emulsion—A Flotation Theory. George Belchic and Roy O. Neal. (82) Sept. 16.
 Nashawauk Iron-Washing Plants.* L. A. Rossman. (16) Sept. 16.
 Allen Automatic Classifier.* J. W. Crowdus. (16) Sept. 16.
 The Invention, Development, and Introduction of the Flotation Process. A. Stanley Elmore. (103) Sept. 23.
 The Use of Borings in Cupola Operations. James A. Murphy. (Paper read before the Am. Foundrymen's Convention.) (20) Sept. 28.
 Use of Titanium in Making Steel Castings.* W. A. Janssen. (Paper read before the Am. Foundrymen's Convention.) (20) Sept. 28.
 Automatic Skip Handles Hot Ore. H. V. Shiefer. (13) Sept. 28.

Military.

- Seacoast Defense.* George A. Zinn. (2) Sept.
 Hospital Train for the U. S. Army. (18) Sept. 2.
 Providing Water-Supply for a Large Militia Camp.* (13) Sept. 14.
 Operations on the British 12-In. Mark IV, Howitzer Shell.* (72) Sept. 21.
*Les Usines Nationales de Munitions en Angleterre.** P. Calfas. (33) Aug. 26.
*Les Fusées des Obus Allemands et Autrichiens.** Nicolas Flamel. (33) Sept. 2.

Mining.

- The Estimation of Moisture in Coal.* T. F. Winmill. (106) Vol. 51, Pt. 4.
 Hydraulic Sand and Gravel Mining. R. J. Borhek. (67) Sept.
 Explosibility of Gases from Mine Fires. G. A. Burrell and G. G. Oberfell. (From *Technical Paper 134*, United States Bureau of Mines.) (57) Sept. 1.
 Surface Plant at Brodsworth Main Colliery.* (57) Sept. 1.
 Coal Mining Under the River Waikato and Lake Hakanoa, N. Z.* (57) Sept. 1.

* Illustrated.

Mining—(Continued).

- Coals and Other Minerals in Japan. Watson Smith. (29) Sept. 1.
 Mining and Smelting at Casapalca, Peru. Thomas F. Roche. (82) Sept. 2.
 Handling Water in Underground Workings.* H. S. Geismer. (45) Sept. 2.
 Mining Methods at Mount Lyell.* R. M. Murray. (Paper read before the Australian Inst. of Min. Engrs.) (16) Sept. 2.
 Mines and Mining Operations at Ely, Nevada.* A. G. Hillen. (82) Sept. 2.
 Electric Equipment in Donetz Coal Mines. (57) Sept. 8.
 Nationalisation of Coal Mines. David Evans. (22) Sept. 8.
 Driving a 1 200-Ft. Raise.* S. Ford Eaton. (16) Sept. 9.
 Mine Explosions. Frank Haas. (45) Sept. 9.
 Operations of Silver King Coalition Mines Co., Park City, Utah.* W. A. Scott. (82) Sept. 9.
 The Patino Tin Mines, Bolivia.* Benjamin L. Miller and Joseph T. Singewald, Jr. (16) Sept. 9.
 Underground Mining in Cuba.* L. B. Reifsneider. (16) Sept. 16.
 The Season of Explosions. J. W. Powell. (45) Sept. 16.
 Mining Methods Employed in the Anthracite Field.* H. M. Crankshaw. (45) Serial beginning Sept. 16.
 Rock Drilling with a Gasoline-Air Drill.* H. L. Hicks. (86) Sept. 20.
 Blasting Boulders and Rock Ledges.* Thomas M. Knight. (86) Sept. 20.
 Some Dredging Costs Based on Actual Dredging Experience.* Charles James and Henry Jennings. (From *Bulletin 121*, Bureau of Mines.) (86) Sept. 20.
 Procedures that Reduced Costs in Sinking Four Inclined Mine Shafts.* Albert E. Hull. (86) Sept. 20.
 Dredging in Montana.* Hennen Jennings. (103) Sept. 23.
 Drive Roosevelt Drainage Tunnel Rapidly. (14) Sept. 23.

Miscellaneous.

- Insulation Against Heat and Cold. C. B. Rowley. (Abstract of paper read before the Cleveland Eng. Soc.) (47) Aug. 25.
 The Art of Coating Paper.* (12) Serial beginning Aug. 25.
 Mobilizing Our Industrial Resources. Howard E. Coffin. (9) Sept.
 The Henrich Harmonic Analyzer and Devices for Extending and Facilitating its Use.* Dayton C. Miller. (3) Sept.
 Standardization. C. Le Maistre. (42) Sept.
 Preparing Our Industries for the Coming Test. Edward N. Hurley. (9) Sept.
 The Commercial Fertilizer Industry in the United States.* Lester W. Tucker. (109) Sept.
 Value of Concise Records to the Engineer. Ray S. Huey. (Paper read before the Assoc. of Iron and Steel Elec. Engrs.) (62) Sept.
 Time Studies for Efficiency in Steel Mills. W. Trinks. (116) Sept.
 What Is Preparedness? H. L. Gantt. (9) Sept.-Oct.
 On a Method of Measuring the Pressure of Light by Means of Thin Metal Foil.* Gilbert D. West. (Abstract of paper read before the Physical Soc. of London.) (73) Sept. 1.
 The Time Factor in the Formation of Aromatic Hydrocarbons from a Paraffin Base Oil. Gustav Egloff and Thomas J. Twomey. (105) Sept. 1.
 Atmospheric Humidity and Its Measurement. Kenneth G. Smith. (103) Sept. 2.
 The Davis Spot Test in the Preliminary Examination of Creosote Oils. (86) Sept. 6.
 Spotting Fires in 29 Miles of Wood Snowsheds.* (13) Sept. 7.
 The Welfare of Munition Workers.* (11) Sept. 8.
 Modification of Bloch's Method of Calculating Illumination, with Calculations Only Comprehensible to Engineers Eliminated, Can be Made Understandable to Layman.* Robert French Pierce. (24) Sept. 11.
 The Effect of Aluminium Chloride Upon a Naphthene Base Oil in the Formation of Gasoline, Unsaturated and Aromatic Hydrocarbons. Gustav Egloff and Robert J. Moore. (105) Sept. 15.
 New Sulphuric Acid Plant.* T. N. Harris. (105) Sept. 15.
 The Manufacture of Tannin Extracts and the Use of a New Evaporator.* (105) Sept. 15.
 What Scientific Management Accomplishes for the Employer and the Employee.* Dwight T. Farnham. (76) Sept. 19.
 Two Fundamentals in Purchasing.* H. B. Twyford. (20) Sept. 21.
 Amortization and Depreciation. Robert S. Lewis. (103) Sept. 23.
 Post-Mortem Appraisal of Industrial Plant. Charles H. Higgins. (13) Sept. 28.
- Municipal.** Excavation in Shallow Cuts (for Chicago Surface Lines).* Merrill J. Recent Municipal Work in Cambridge.* Julian Julian. (114) June. Replanning and Districting Sacramento, Calif.* (13) Sept. 7.

Wimulu—(Courtney)

2025 RELEASE UNDER E.O. 14176

Environ Monit

Repubblicano e del Partito Socialista Comunista Città. (13) Sbarcò il generale (14) Tassan

Railroads.

- Petrol-Electric Rail Motor Car.* (23) Aug. 18.
 New Express Passenger and Goods Locomotives for the French State Railways.*
 (23) Aug. 18.
 Commercial Motors for Railway and Industrial Purposes. (23) Aug. 18.
 A New Terminus for the Southern Railway at Birmingham, U. S. A.* (23)
 Aug. 25.
 All-Electric Signalling at Adelaide, South Australia.* C. G. Pilkington. (23)
 Aug. 25.
 Mallet Locomotive for the Baltimore and Ohio Railway.* (11) Aug. 25.
 Erie Railroad 50-Ton Hopper Cars.* (25) Sept.
 Simple Methods of Collecting Scrap.* J. B. Baker. (87) Sept.
 Two Ballast Plants on the Alton.* (87) Sept.
 Methods of Repairing Track Tools.* (87) Sept.
 Considerations in Guard Rail Design.* James G. Wishart. (87) Sept.
 Preventing Right of Way Fires.* E. R. Lewis. (87) Sept.
 A Machine to Oil Track Fastenings.* (87) Sept.
 Garratt Type Locomotives for Brazil.* (25) Sept.
 Locomotive Boiler Efficiency: Not Governed by Mere Extent of Heating Surface;
 Firebox Offers Largest Field for Improvement.* J. T. Anthony. (25) Serial
 beginning Sept.
 Daylight Lamp Signals on the Pennsylvania Railroad.* (12) Sept. 1.
 The Present and Future Development of Interurban Railways. F. W. Doolittle.
 (17) Sept. 2.
 Hospital Train for the U. S. Army. (18) Sept. 2.
 Signals on the Scranton & Binghamton Railway System.* (17) Sept. 2.
 Rehabilitation of Freight Car Equipment. M. K. & T. R. R.* (18) Sept. 2.
 Montreal & Southern Counties Railway; St. Cesaire-Granby Extension Forms a New
 Milestone in Canadian High-Speed Electric Railway Development.* (17) Sept. 2.
 Steel Car-Repair Shed with Cement-Tile Roof.* (13) Sept. 7.
 Experimental Track in Holland.* K. den Tex. (15) Sept. 8.
 Cost of Installation of Automatic Train Control in Connection with Automatic Block
 Signals. A. G. Shaver. (18) Sept. 9.
 Six-Cent Fare Disallowed for Bay State. (17) Sept. 9.
 New Central Railway Station in Leipsic.* (15) Sept. 15.
 Caboose for Nashville, Chattanooga & St. Louis.* (15) Sept. 15.
 Recent Baldwin Locomotives for Export.* (15) Sept. 15.
 New Lehigh Valley Terminal at Buffalo.* (15) Sept. 15.
 Cableway Railroad Afords Access to Nevada Quarry.* (14) Sept. 16.
 Handling of Filipino Labor One of the Problems in Construction of Baguio Railroad.*
 W. M. Butts. (14) Sept. 16.
 Track Maintenance.* Kenneth L. Van Auken. (18) Sept. 16; (14) Sept. 2.
 The Baldwin Locomotive Works, Decauville Type Locomotives for Light Service.*
 (86) Sept. 20.
 A Brazilian Railroad Shop.* (72) Sept. 21.
 Train Handling on Heavy Grades. Edward F. McKenzie. (15) Sept. 22.
 Dallas Railway Completes Seven-Track Interurban Terminal.* Edwin T. Moore.
 (17) Sept. 23.
 Pounding Prevented in 100-Ft. Santa Fé Turntable.* (14) Sept. 23.
 Illinois Central R. R.'s Plan for New Terminal in Chicago.* (18) Sept. 23; (15)
 Sept. 22.
 Types of Dump-Cars Used on Construction Work.* (13) Serial beginning Sept. 28.
 Valuation of Rock Island Terminal Zone in Chicago Presents Many Special Prob-
 lems.* C. W. Stark. (14) Sept. 30.

Railroads, Street.

- Concrete Lined Tube, 12 000 Feet in Length.* (67) Sept.
 The Fundamentals of Power Saving. William Arthur. (17) Sept. 2.
 Equipment of the "Safety" Car.* (17) Sept. 2.
 Home-Made Frogs.* C. Benham, Jr. (17) Sept. 2.
 New York Subway's Largest Elevator Shaft Sunk under Forty-Second Street.*
 (14) Sept. 2.
 The Paving of Street Railway Track Areas.* L. McLaren Hunter. (96) Sept. 7.
 Methods of Handling Track Work in Kansas City.* (17) Sept. 9.
 Unballasted Track Gives 50 Per Cent. Lower Maintenance Cost.* William S.
 Twining. (17) Sept. 16.
 Installation and Maintenance of Car Lightning Arresters.* R. H. Parsons. (17)
 Sept. 16.
 Steam Shovel Excavation in Shallow Cuts (for Chicago Surface Lines).* Tirrell J.
 Ferrenz. (86) Sept. 20.
 Pneumatic Machines Reduce Tamping Gangs from Six to Two (on Electric Rail-
 ways).* H. L. Hicks. (17) Sept. 23.

* Illustrated.

Roads and Pavements.

- The Manufacture of Concrete Flags as a Municipal Undertaking. J. W. Tomlinson. (114) June.
- Bituminous Road Surfacing Scheme.* A. Dryland. (114) June.
- Penetration Methods with Refined Tars. A. W. Dean. (Paper read before the Canadian Internat. Good Roads Congress.) (96) Aug. 31.
- Granite Pavement Construction in Brooklyn, N. Y.* (60) Sept.
- Street and Road Pavements, Their Design, Construction and Maintenance.* Charles Carroll Brown. (60) Serial beginning Sept.
- Surfacing a Road at One Operation.* (67) Sept.
- Asphaltic Road Oils Heated Quickly in Retort.* (14) Sept. 2.
- Superelevation Determined for Highway Curves.* (14) Sept. 2.
- Worn Macadam Road Repaired by Tar Spraying. Robert H. McNeilly. (14) Sept. 2.
- Wear of Concrete Pavement Due to Scaling of Mortar Coat.* T. R. Agg and C. B. McCullough. (From *Technical Report No. 1*, Iowa State Highway Comm.) (86) Sept. 6.
- Notes on the Principles Governing the Design of the Gravel and Macadam Highways of the Philippine Islands. J. L. Harrison. (86) Sept. 6.
- Methods of Maryland Roads Commission for Preventing Erosion of Road Shoulders and Slopes.* (86) Sept. 6.
- Wear of Concrete Pavements Due to Abrasion of Mortar Coat.* T. R. Agg and C. B. McCullough. (From *Technical Report No. 1*, Iowa State Highway Comm.) (86) Sept. 6.
- Methods and Costs of Constructing Bituminous Surfaced Concrete Roads in California.* (86) Sept. 6.
- Cost of Testing Road-Building Materials; New York. (13) Sept. 7.
- Granite-Block Pavement for a Residential Street.* (13) Sept. 14.
- Construction and Maintenance of Roads in the Arid West. (13) Sept. 14.
- Building the Storm King Road.* (13) Sept. 28.
- In Monolithic Pavements in Vermillion County, Illinois, Brick are Laid Directly on Concrete Base.* Harlan H. Edwards. (14) Sept. 30.

Sanitation.

- Health of Old Colliers. J. S. Haldane. (106) Vol. 51, Pt. 4.
- Experimental Work with Reference to the Purification of Sewage by Aeration, Activated Sludge, Etc. John Haworth. (Abstract of paper read before the Assoc. of Managers of Sewage Disposal Works.) (96) Aug. 31.
- The Sewage Disposal Problem Confronting the City of Philadelphia. W. L. Stevenson. (109) Sept.
- Iron and Steel Sewer Pipe.* J. F. Springer. (60) Sept.
- Operating Costs in Combined Power and Heating Plants.* Charles L. Hubbard. (9) Sept.
- Warm Air for Industrial Drying Processes.* Gilbert C. Shadwell. (101) Sept. 1.
- Double Tank Proposed for Residential Sewage Plants.* Waldo S. Coulter. (14) Sept. 2.
- Street Cleaning with Power Driven Street Sweepers at Los Angeles, Cal.* (86) Sept. 6.
- Recommendations for a Model Street Cleaning District.* (86) Sept. 6.
- Experience of Glasgow, Scotland, with Motor Street Sweeping Machines. (86) Sept. 6.
- Railway Terminal Built over Large Drainage Channel.* Charles C. Hurlbut. (13) Sept. 7.
- Inverted Sewer Siphons under New York Subway.* (13) Sept. 7.
- Mechanical Equipment in a New York School.* Frank G. McCann. (101) Sept. 8.
- Plumbing and Heating Systems in New Jail.* (101) Sept. 8.
- Electric Water Heating as Applied to Domestic Service.* C. W. Crosbie. (73) Sept. 8.
- Hot-Water Heating Plant of the Crane Co., Chicago.* Thomas Wilson. (64) Serial beginning Sept. 12.
- Suggested Design of Disposal Plant for Creamery or Cheese Factory Wastes.* A. Elliott Kimberly. (From *Ohio Public Health Journal*.) (86) Sept. 13.
- Evanston Intercepting Sewer, Chicago, Ill.* (86) Sept. 13.
- Quantity of Gasoline Necessary to Produce Explosive Conditions in Sewers. G. A. Burrell and H. T. Boyd. (Abstract from a report to the Bureau of Mines.) (86) Sept. 13.
- Remarkable Efficiency Test of Imhoff Tank. H. V. Hinckley. (86) Sept. 13.
- Cost of Laying Tile Drain on Two Jobs.* H. R. Ferris. (86) Sept. 13.
- Effect of Sewer Gas on Concrete in a Chicago Sewer.* (13) Sept. 14.
- Air Movement in Mine Ventilation.* (101) Sept. 15.
- Electrolytic Sewage-Treatment Tests at Durant, Okla.* (13) Sept. 21.
- Research Work for the Operating Engineer—Heating Problems.* Charles L. Hubbard. (64) Sept. 26.

Sanitation—(Continued).

- Successful Sewage Disposal by Broad Irrigation.* Terrell Bartlett. (13) Sept. 28.
Refuse Incinerator for Queens Borough, New York City.* J. C. Woodman. (13) Sept. 28.

Structural.

- The New Eastern Entrance to the Canadian National Exhibition. E. M. Proctor. (96) Aug. 31.
Concreting.* W. J. Potter. (67) Sept.
The Economical Brick Mortar. (67) Sept.
Columns in First Floor of Boston Theater Avoided by Use of 106-Foot Truss.* (14) Sept. 2.
Test Earth Pressures in Subway Excavation.* (14) Sept. 2.
Failure of Roxbury School Building Apparently Caused by Faulty Brick Piers.* (14) Sept. 2.
Eccentric Loading on Columns Discussed Accompanied by Formulas and Table.* R. Fleming. (14) Sept. 2.
Complete Tests of Mortars and Concretes Reported by U. S. Bureau of Standards.* (14) Sept. 2.
Why Highly Oxidized Red Lead is Superior. G. W. Thompson. (82) Sept. 2.
Graphical Analysis of Continuous Beams by the Use of the Principle of Continuity.* Cyril Provo Hubert. (96) Sept. 7.
Follow this Advice in Cold Weather Concreting. (14) Sept. 9.
Cantilevers Carry Building Columns above Tunnel.* (14) Sept. 9.
Slab-and-Beam Floor without Shear Stirrups.* J. H. Byrd. (14) Sept. 9.
Normal Fracture of Good Malleable Iron.* Enrique Touceda. (Paper read before the Am. Foundrymen's Assoc.) (20) Sept. 14.
Countersunk Rivets. R. Fleming. (13) Sept. 14.
The Presence of Alumina in Steel.* George F. Comstock. (From paper read before the Am. Foundrymen's Assoc.) (20) Sept. 14.
Marquise Construction for Entrance Canopy.* T. H. J. (101) Sept. 15.
The Effect of Corrosion on the Ductility and Strength of Brass.* Paul D. Merica. (105) Sept. 15.
Design of Factories for the Manufacture of Dyestuffs.* Percival Robert Moses. (105) Sept. 15.
Rock Island Finds Concrete Cribbing Effective.* (14) Sept. 16.
Effect of Vibration in Factory Buildings. (14) Sept. 16.
Motor Trucks Distribute Materials within the Job.* (14) Sept. 16.
Steel Arches are Designed to Eliminate Rim Tension in Oil Reservoirs.* Henry B. Post. (14) Sept. 16.
Insurance Rates Call for Grading of Cities. (14) Sept. 23.
Large Mill-Refuse Burner Built of Concrete and Brick.* N. J. Blagen. (13) Sept. 28.
Big Stack Falling from Broken Boom Tests Concrete Floor.* Henry Blood. (13) Sept. 28.
New Columns and Trusses to Support Added Stories in Engineering Societies Building.* (14) Sept. 30.
Creosoting Effective for Fence Posts.* (14) Sept. 30.

Topographical.

- A Method of Transforming Latitude and Longitude into Plane Co-ordinates.* Sturgis H. Thorndike. (109) Sept.
Combination of Plane Table and Transit for Topography.* Holbert T. Johnson. (13) Sept. 14.

Water Supply.

- Comparative Water Service Costs. P. M. La Bach. (87) Sept.
Progress of Water Disinfection in Maryland.* Robert B. Morse and Harry R. Hall. (28) Sept.
Experience with Wood Pipes in New Hampshire.* Arthur W. Dudley. (28) Sept.
Report of Committee on Meter Rates of the New England Water Works Association. (28) Sept.
The Proposed Auxiliary Water Supply of Brockton, Mass.* Robert Spurr Weston. (28) Sept.
Rapid Sand Filters in Ohio. (60) Sept.
Elephant Butte Dam.* (12) Sept. 1.
Two Small Hydroelectric Plants in New Zealand.* (12) Sept. 1.
Measuring Water With a Weir Meter.* E. G. Bailey. (Paper read before the Ohio Soc. of Mech., Elec. and Steam Engrs.) (105) Sept. 1.

Table I gives the results of the experiments made at the Bureau of Fisheries, Seattle, Washington, in 1901, to determine the comparative feeding value of various kinds of fish to salmonids.

Water Supply—(Continued).

- Solids a Problem at Power Plants in Northwest.* John Harisberger. (14) Sept. 2.
- The Strawberry Drop-Filled Dam.* (111) Sept. 2.
- Cumulative Counterweights Feature Spillway Crest. Joseph Wright. (14) Sept. 2.
- Concrete Dam Far from Railroads Built Largely with Materials at Hand.* (14) Sept. 2.
- Chlorinating the Water Supply of Greater New York.* T. D. L. Coffin. (13) Sept. 7.
- Hydrated Lime Pays at Council Bluffs Settling Basins. J. B. Thornell. (13) Sept. 7.
- Setting 10 000 Water Meters.* (13) Sept. 7.
- Melted Snow Supplies Water to Arid District.* (13) Sept. 7.
- Stopping Underground Leakage from a Power Dam.* (13) Sept. 7.
- Supply Main Sustains Capacity for 28 Years. (13) Sept. 7.
- Old Brick Intake Tunnel Shows Low Kutter Factor.* Dabney H. Maury and Robert E. Horton. (13) Sept. 7.
- Pumping Six Million Gallons Daily by Water Power.* (13) Sept. 7.
- Profit in Water-Works Forestry at Nashua, N. H.* (13) Sept. 7.
- Brookline Iron-Removal Plant.* (13) Sept. 7.
- The Alignment Diagram Applied to the Flow of Water in Uniform and Compound Mains.* D. Halton Thomson. (Paper read before the Institution of Water Engrs.) (96) Sept. 7.
- Wire Rope Removes Moss from Lake Water Supply.* (14) Sept. 9.
- Ideal Organization for Waterworks Described.* H. A. Whitney. (14) Sept. 9.
- Riparian Rights Settled by Arbitration After Suit. Frank P. McKibben. (14) Sept. 9.
- Pipe Trestles of Wood Replaced by Concrete.* John S. Ely. (14) Sept. 9.
- Special Devices Installed to Improve Operation of New Mechanical Filters.* E. E. Harper. (14) Sept. 9; (86) Sept. 13.
- New Dam Increases Salt Lake City Water Supply.* (14) Sept. 9.
- Construct Dams by Hydraulic Method with Minimum of Cost, Labor and Equipment.* Cyril Wigmore. (14) Sept. 9.
- Notched Steel Brackets Aid Placing of Hoop Reinforcement for Concrete Reservoir.* E. W. Kelly. (14) Sept. 9.
- Bronze-on-Bronze Friction in Sluice Gate Tested. D. C. Henny. (14) Sept. 9.
- Equipment for Testing Water Meters Quickly in the Field.* W. T. McClenahan. (14) Sept. 9.
- Improved Multi-Stage Centrifugal Pump.* (82) Sept. 9; (86) Sept. 13.
- Decision of Public Service Commission of Washington on Irrigation Rates. (111) Sept. 9.
- Suggested Milk of Lime Cure for Red Water, Montclair, N. J., Water Supply.* Nicholas S. Hill, Jr. (86) Sept. 13.
- Practice in the Removal of Iron from Municipal Water Supplies. James W. Schwab. (Abstract from *Engineering Bulletin* No. 7, University of Kansas.) (86) Sept. 13.
- Studies of Character and Rate of Silting of Elephant Butte Reservoir, U. S. Reclamation Service. (From *Reclamation Record*.) (86) Sept. 13.
- Lining a Steel Conduit with Cement Gun, Baltimore Water Works. (86) Sept. 13.
- Providing Water Supply for a Large Militia Camp.* (13) Sept. 14.
- New Knowledge on Standard Reservoir Mouthpiece.* W. S. Pardoe. (13) Sept. 14.
- Goose Lake Valley Irrigation System, Oregon.* Kenneth A. Heron. (13) Sept. 14.
- More Proof of Need of Supervision of Dams.* Ralph Bennett. (14) Sept. 16.
- Elephant Butte Reservoir to Serve 233 Years. (14) Sept. 16.
- Concrete Pipe Irrigation Systems.* (111) Sept. 16.
- Traveling Screens at Stations of Philadelphia Electric Co.* Henry J. Edsall. (64) Sept. 19.
- Cost of Earth Work of the Second Unit of the Dodson North Canal, Milk River Project, Malta, Mont.* A. E. Bechtel. (86) Sept. 20.
- Hydraulic Principles of Flume Intakes and Outlets.* A. C. Norton. (13) Sept. 21.
- Drifting-Sand Water Filters for Toronto, Ont.* (13) Sept. 21.
- Why American Water Pipes Are Best.* Percy G. Donald. (101) Sept. 22.
- Tennessee River Hydroelectric Installation Being Completed with Modern Turbines.* (14) Sept. 23.
- North Memphis Pumping Station.* T. M. Heermans. (64) Sept. 26.
- Producer-Gas Engines Drive Water-Works Pumps.* (13) Sept. 28.
- Lining a 114-Ft. Well with Precast Concrete Rings.* (13) Sept. 28.
- Careful Construction to Make Large Dam for Youngstown, Ohio, Watertight.* (14) Sept. 30.
- Filtered-Water Supply for Sacramento Recommended. (14) Sept. 30.
- How Horsepower is Burned up at Arrowrock Dam. (From *Reclamation Record*.) (14) Sept. 30.
- Solve Silt Problem on Yuma Irrigation Project. (From *Reclamation Record*.) (14) Sept. 30.

Waterways.

- Concrete Wharf Exposed to Sea Water and Wave Action at Fort Williams, Maine.* Francis A. Pope. (100) Sept.-Oct.
- Physiographic Principles Manifest in the History of Attempted Control of Yellow and Mississippi Rivers. Henry M. Eakin. (100) Sept.-Oct.
- Service and Guard Gates for Third Lock at St. Marys Falls Canal.* Isaac De Young. (100) Sept.-Oct.
- Breakwater at Sandy Bay, Cape Ann, Massachusetts.* William E. Craighill. (100) Sept.-Oct.
- The United States Seagoing Dredge Col. P. S. Michie. (100) Sept.-Oct.
- The Cofferdam at Lock No. 2, Cape Fear River, North Carolina.* Norman M. Chivers. (100) Sept.-Oct.
- Pile-Drawing.* (11) Sept. 1.
- Steel Cofferdam of Pocket Type Successful for Lock on Cape Fear River.* (14) Sept. 9.
- Power Equipment for the Barge Canal System of the State of New York. C. H. MacCulloch. (86) Sept. 13.
- Determination of Roughness Coefficient for Kutter's Formula for Dredged Ditches in Bolivar County, Mississippi.* Charles E. Ramser. (Abstract of Report made to the Office of Public Roads and Rural Engineering.) (86) Sept. 13.
- Concrete Ocean Pier Built in Form of Hollow Triangle.* C. L. Roberts. (13) Sept. 14.
- Timber and Gravel Cofferdams on the Troy Dam.* D. A. Watt. (13) Sept. 14.
- Wire Drag Supplements Lead Line in Sounding. (14) Sept. 16.
- New Coal Pier of the B. & O. R. R., at Curtis Bay, Baltimore.* (18) Sept. 16.
- Colorado River Conditions this Year Unprecedented.* (14) Sept. 16.
- Steel Sheetpile Cofferdams for Troy Lock and Dam.* D. A. Watt. (13) Sept. 21.
- Le Port de Bordeaux, les Installations Maritimes de la Rive Droite de la Garonne à Bordeaux et le Nouveau Port de Bassens.* Auguste Pawlowski. (33) Sept. 2.
- Les Ports Français et la Guerre.* Auguste Pawlowski. (33) Sept. 16.
- Die Hafenanlagen an der See.* Conrad Zschokke. (107) Serial beginning Aug. 26.

* Illustrated.